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FM 17-50

WAR DEPARTMENT

**ARMORED FORCE FIELD
MANUAL**



LOGISTICS

November, 7 1942

FM 17-50

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MANUAL**



LOGISTICS



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G. C. MARSHALL,
Chief of Staff.

OFFICIAL:

J. A. ULIO,
Major General,
The Adjutant General.

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(For explanation of symbols see FM 21-6.)

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CHAPTER 1

MOVEMENTS AND SHELTER

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SECTION I

MARCHES

■ 1. GENERAL.—The provisions of FM 100-5, 101-10, and 25-10 apply in general to marches of armored force units.

a. A successful march is one that places troops at their destination at the proper time and in fit condition to carry out any contemplated action. It requires careful planning, preparation, and execution.

b. Armored elements must be trained to move on short notice. In most situations there will be little time for the issuance of detailed orders; therefore routine matters in regard to marches should be covered in standing operating procedures.

c. Prior to a march, commanders must place men, vehicles, and equipment in the best possible condition and maintain that condition by necessary supervision during the march. All vehicles must be serviced, tools and spare parts checked, and extra gasoline and oil loaded.

d. A march may be either administrative or tactical. An administrative march is one in which no tactical situation is involved. It may be held for the primary purpose of instruction of personnel in march discipline. A tactical march is one made in connection with a tactical situation either actual or assumed.

e. The vulnerability to air attack and secrecy desired, and time available are the deciding factors in determining the distance to be designated between vehicles and march units.

The threat of attack by hostile mechanized forces does not normally affect these distances to the same extent as does hostile aviation or the need for secrecy. Three types of marches have been evolved to meet these conditions: infiltration, close column, and open column. (See FM 25-10.)

(1) *Infiltration.*—(a) When time is not a deciding factor and danger of hostile air attack is great, marching by the infiltration method may be used. In this method vehicles are dispatched singly or in small groups at irregular intervals over well-marked or guide-controlled routes. The time between vehicles depends upon the vehicle density required and may vary from 1 to 3 minutes. A high state of training, careful planning, and detailed instruction to personnel are essential to success of this type of movement.

(b) This method of marching does not offer a remunerative target for hostile air attack and is not vulnerable to hostile artillery fire. It affords some secrecy in that hostile air observers will not be able to estimate accurately the strength of the force. Cross traffic presents no problem as the distance between vehicles gives ample time for single vehicles to cross the column. However, time length of the column is increased greatly; control of units is difficult; and it is not practicable when units are likely to engage in combat before the movement is completed. Because of the difficulty of control this method should not be used on dark nights.

(2) *Close column.*—(a) When time is vital, maximum control necessary, and hostile air threat remote, a close column formation may be used. In this method of march the road is used to its maximum capacity. Minimum safe driving distances are prescribed and distances between march units are reduced to the minimum.

(b) This method of marching offers good control of units and reduces the time length of the column to the minimum. Fewer guides and traffic control personnel are necessary. It is suitable for night marching. However, when hostile aircraft is active, the commander may expect to take severe losses and the time gained must be weighed against the probable losses before such movement is ordered. This method also makes the column vulnerable to hostile artillery fire and mechanized attack, causes greater fatigue to drivers

and passengers than when an open column formation is used, and is also susceptible to whip.

(3) *Open column*.—(a) This is a compromise between the infiltration and close column types. Distances are less than in infiltration and greater than in close column. Distances between march units may be greater than in close column. This type of march will be employed more frequently than either of the other two types.

(b) Open column marching is used as a passive defense against hostile air attack as it does not provide a remunerative target for such attack. In night marches the open column affords some secrecy as to the size of the force, only a few vehicles being disclosed by one flare dropped by hostile air observers. Open column does not offer a good target for mechanized attack. However, open column increases the time length of the column and makes control more difficult.

■ 2. MARCH PLANNING AND ORDERS.—a. *General*.—Careful march planning, issuance of detailed instructions, and training in march discipline are essential to successful marching.

(1) Factors and conditions to be considered by the commander in planning a march are mission, tactical situation, size and composition of the force, routes available and their conditions, training and condition of personnel, mechanical condition of vehicles, weather, terrain, supply conditions, number and length of columns, distance or length of march, and phase lines or objectives. Consideration must be given to the comfort of personnel and the required vehicular maintenance. The alternating of drivers with assistant drivers reduces fatigue and improves march discipline. All members of vehicle crews should be trained to drive.

(2) Armored units are sensitive to terrain; consequently, plans must be flexible as to routes and alternate routes or zones to avoid unfavorable terrain. A route reconnaissance for both contemplated and alternate routes for a march must be made whenever practicable. In selecting routes it will frequently happen that a route longer in miles will be materially shorter in time and will permit personnel and vehicles to arrive at their destination in better condition.

(3) When the situation is obscure or contact with the enemy is likely, successive march objectives consisting of well-defined terrain features are assigned for coordination and control.

(4) Coordination of a movement of armored force units through slower moving troops must be arranged by higher commanders.

(5) Arrangements will be made for the cooperation with state highway officials in any extended movement of troops over public highways. Similar arrangements will be made with large municipal authorities for passing through their localities.

b. Arrangement of troops in a march column (see FM 17-10).—(1) March serials consist of one or more march units placed under one commander for march purposes. When practicable, it is desirable that the vehicles of a march unit have the same march characteristics. This arrangement of vehicles with the same march characteristics will seldom be practicable with the combat vehicles of armored units as each line company of the tank regiments has two types of combat vehicles.

(2) In tactical marches the elements of the column are habitually arranged from front to rear in the order in which their employment is contemplated. Necessary reconnaissance and security of the front, flanks, and rear, must be provided.

(3) In administrative troop movements covering 2 or more days, battalions and separate companies and the companies within a battalion should be rotated daily in their position in column.

(4) Artillery elements during daylight marches are well forward in the column, prepared to support the advance guard and to cover the deployment of the main body.

(5) Engineer detachments are placed with the reconnaissance elements, with the advance guard, and toward the head of the main body.

(6) On tactical marches and when combat is imminent, the battalion medical section pertaining to the armored battalion will march at the rear of the battalion. On administrative marches medical personnel and ambulances march at

the rear of each march column or serial. Medical personnel and ambulances may accompany flank and rear guards. (For further details of march dispositions of medical units see FM 8-10.)

c. Dissemination of information.—To insure coordinated efforts of all elements in tactical situations and movements, information regarding such items as missions, routes (both contemplated and alternate), intermediate march objectives, and bivouac areas should be disseminated down to include vehicle crews. When secrecy in connection with a movement is necessary, the dissemination of all or part of this information is delayed as long as practicable.

d. Warning orders.—Warning orders should be issued whenever practicable. As much detail as is available should be included in the order to reduce details in the march order. Tactical orders should not be delayed for the inclusion of administrative matter. (See FM 100-5.)

e. Standing operating procedure.—Standing operating procedure (SOP) is a compilation of instructions concerning the normal operation of a unit in the field. The purpose is to outline a normal procedure and thus avoid the issuance of long orders covering routine matters in the field. (See FM 100-5 and 101-5.) Standing operating procedure which conforms to the SOP of the next higher element will be developed in all units.

f. Trains.—(1) Trains usually do not accompany the combat elements when combat is imminent but are held in rear areas under protection of its organic weapons. When trains accompany the columns they may follow without distance if protection is essential or they may advance by bounds.

(2) Because of enemy reaction and weather conditions, supply routes may be different from the routes of advance of the combat elements. Alternate routes for trains are selected when possible.

g. Factors affecting number of columns.—There are several factors, in addition to the routes available, which must be considered in determining the number of columns.

(1) Single column facilitates control and employment to a flank. It decreases the distance that may be marched in

a given time and may delay the commitment of troops to action.

(2) Multiple columns facilitate deployment to the front and concealment from aerial observation, increase the distance that can be marched in a given time, and permit greater vehicular distances to reduce effectiveness of air attacks.

h. Speed and rates of march.—(1) The term "rate of march" is defined as the average speed over a period of time including short periodic halts. The halts for meals and extended halts for refueling are not included.

(2) "Speed" is defined as the rapidity of movement at any particular instant expressed in miles per hour.

(3) Some of the factors determining the rate of march of a column are maximum allowable speeds of the slowest vehicles in the column; condition and type of roads to be traversed; defiles, including bridges and streams to be crossed; congested areas to be passed through; weather conditions; time of day; and the tactical situation.

(4) If a march order prescribes a rate of march of 20 miles per hour, it requires an average vehicular road speed of about 27.5 miles per hour to provide for the loss in speed when passing through congested districts, hilly sections, over bad sections of roads, through defiles and over bridges, and during routine halts. In general for each period of time of march at less than the prescribed rate, a corresponding increase of speed must be maintained for a like period. Thus it is apparent that a vehicle with an engine governed for a top vehicular speed of 25 miles per hour is not capable of a rate of march of 20 miles per hour.

i. Length of marches.—(1) Armored units, with well-trained personnel and with vehicles in good mechanical condition, can march 150 miles per day at a rate of about 17 miles per hour. The rate of march for columns containing medium tanks is limited to the rate of march of the medium tanks. Marches will usually average about 100 miles daily. The foregoing is based on daylight marches, good road and weather conditions, and on columns not exceeding a reinforced regiment in size. Unfavorable road or weather conditions will materially reduce march distances. A lay-over of not

less than 1 day in 5 is used for the rehabilitation of vehicles and personnel. The required periodic check of vehicles must be made.

(2) Armored units may materially increase the distance of normal daily marches by increasing the hours of marching. These increased march distances can be maintained for only a few days at a time due to the disproportionate increase of fatigue to personnel and the increased maintenance resulting. Troops and vehicles must arrive at their destination in effective condition for combat.

(3) An attempt to hasten the arrival of troops at an objective by increasing the rate of march should be resorted to only for comparatively short distances and in a tactical emergency. Plans should provide for starting the march early enough to obviate the necessity for this increase.

(4) The length of a march column materially affects the distance of a day's march. The longer the column, the shorter must be the distance of a day's march, unless elements of the column bivouac in different areas along the route.

(5) If conditions permit, daylight marches should be planned so that at least 30 minutes of daylight are available to troops before the start of a march, and so that the last troops to arrive at the new bivouac will have time to service vehicles, erect shelter, and feed personnel before dark. Ample time for daylight repair and maintenance is desirable. (See par. 4o.)

■ 3. PRELIMINARY RECONNAISSANCE, GUIDES AND GUARDS.—a. *Reconnaissance.*—(1) In order to determine condition of the route, critical points where units may go astray, and condition of bridges, a preliminary reconnaissance should be made. Personal reconnaissance is made if practicable. When this is impracticable a map reconnaissance supplemented by air reconnaissance is made.

(2) When personal reconnaissance is practicable, all bridges should be inspected by engineer or other qualified personnel. Arrangements are made to strengthen all unsafe bridges. When bridges cannot be reconnoitered, all available data should be obtained from local sources and

arrangements made to have engineers with bridge repair material near the head of the column.

(3) By reconnaissance the places for stationing guides and guards are determined.

b. Guides and guards.—To control traffic, provide for safe passage, and to keep units on the proper route, guides or guards must be stationed at critical points such as road junctions, railroad crossings, and bridges.

(1) *Personnel.*—Military police, motorcyclists of units, and other personnel detailed and trained for the purpose are used as guides and guards.

(2) *Training and equipment.*—Guides and guards must be trained in map reading and traffic control. They should be equipped with flashlights and unit signs as necessary and when practicable have their own transportation.

(3) *Employment.*—(a) There are two general methods for employment of guides:

1. *By column commander.*—In this method, guides march near the head of the leading unit of the column and are posted by the commander of this unit or a specially designated officer or noncommissioned officer. They remain where posted until the entire column passes and then follow the column. When guides are not provided with individual transportation a truck or other vehicle must follow the column to pick them up. This method requires more guides than in the method described in 2 below. However, it has particular application when the march is by infiltration.
2. *Unit guides.*—In this method each march unit or serial has its own guides, each guide having his own transportation. The leading unit of the column posts guides at critical points. A guide remains at his post until relieved by a guide from the next succeeding unit and then moves to rejoin the head of his own unit. This method is practicable when the close or open column type of marching is used. It is not practicable for infiltration as the march unit will be too long for guides to rejoin the head of their units. Each

unit should have its guides precede it so that contact with the unit in front can be maintained and its guides relieved promptly.

(b) Guards are placed at bridges where reduction of speed is necessary and at railroad crossings. At railroad crossings guards may be men from the march unit who operate the same as guides as described in (a) 2 above. Guards at bridges are usually established by the column commander.

(c) Where traffic control may be difficult an officers' control post is established.

(d) Guides should be carefully instructed as to the route. They must know their location and should know the units that constitute the column.

■ 4. CONDUCT OF THE MARCH.—*a. Position of commander.*—

(1) The commander has no fixed position during any march. His place is where he can best influence the movement and keep himself informed as to the conditions existing throughout his command.

(2) When the unit is marching in one column, the commander is usually between the head of the main body and the tail of the advance guard. However, he should by personal observation or staff inspection, acquaint himself with march conditions throughout the column.

(3) When the unit is marching in multiple columns, the commander goes where he believes his presence is most needed. If a hostile attack may be expected from a flank, he should be with or in the proximity of the threatened column. If hostile contact is expected toward the front, he should be well forward.

(4) Commanders of serials and march units usually march at the head of their units. However, they should make frequent inspections of their column.

b. Control.—(1) For administrative marches in peacetime the commander usually has at his disposal every advantage and facility for planning and conducting a march. For control he uses radio communication, motorcycle and motor messengers, and guides and signs posted by route reconnaissance detachments. The designation of phase lines assists in control.

(2) In campaign, higher commanders may impose a radio silence in order to obtain surprise in the use of armored units and for secrecy. This radio silence may obtain in bivouac, on the march, and in assembly areas.

(3) The use of motorcycle and other forms of motor-borne messengers in training and in campaign is necessary in order to habituate commanders and troops to this form of transmission of orders and of control and to supplement the radio. A motorcycle or other mounted messengers may be quicker and more dependable than radio for distances of 5 to 10 miles. This is predicated upon the use of continuous wave radio in a net with several other stations and upon the availability of good roads.

(4) The commander or his designated representative controls and leads the march of the column or serial. He establishes the rate of march to which all elements conform and acts as a pace setter. He maintains a uniform rate thereby eliminating jamming-up or elongation within the march unit. Each subordinate commander conforms to the rate set and maintains contact with the unit next in front, following that unit at the prescribed time interval.

c. March unit.—(1) The company or similar unit is the march unit. In service elements where a greater number of vehicles per organization are involved, the platoon is the march unit. Cargo vehicles are organized into march units of not to exceed 25 vehicles. The march unit moves and halts at the signal or command of its commander. (See FM 25-10 and 100-5.)

(2) The first and last vehicle of each march unit, regiment or separate unit, will carry an identifying sign (marker) on the front and rear respectively of the vehicle. The use of this sign facilitates the formation of columns and in locating elements when breaking up a column going into a bivouac and for other purposes. If the vehicle carrying the "First (last) vehicle" sign (marker) falls out of the column and will not be able to rejoin its unit at the next halt, the maintenance personnel will, at the next halt, cause the sign (marker) to be placed on the first (last) vehicle remaining.

d. Vehicular distances.—(1) The distance between vehicles and between march units may be expressed in ground

distances (yards) or in time. Distances are determined by the tactical situation and by speed of movement.

(2) Road density refers to the number of vehicles on any route considered and is expressed in the number of vehicles to the mile.

(3) A method of regulating distance according to speed is to prescribe a vehicular distance in yards of twice or thrice the speedometer reading in miles. Thus if the speedometer shows the vehicle to be traveling at a speed of 25 miles per hour, the distance from the next preceding vehicle would be 50 or 75 yards. The time interval between march units will vary with the rate of march. It is usually the time length of the march unit.

(a) The commander must determine the rate of march necessary for him to accomplish his mission and at the same time decide on the minimum distance between vehicles for protection from air or ground attack. If, by using the twice speedometer reading method for determining vehicular distance, the distance between vehicles will at any time be less than the minimum necessary to give adequate protection from air or ground attack, then the commander must specify an increased vehicular distance to obtain the desired definite vehicular density irrespective of the varying vehicular speeds or the rate of march. A density of 20 is about the highest that may be used if air attack or artillery fire is probable. This allows a distance of about 88 yards between vehicles.

(b) The following is a general guide as to density permitted under various route conditions in a tactical situation:

	Day		Night	
	Open terrain	Close terrain	Open terrain	Close terrain
Armored vehicles	15	20	Depends on light conditions.	
Unarmored vehicles	10	15		

NOTES

1. By "open terrain" is meant country that is generally level, with straight roads and comparatively few trees.

2. By "close terrain" is meant country that is generally hilly, well wooded, and with winding roads.

3. For night movements vehicles may be grouped with closed distances with about five vehicles in a group. The distance between groups will determine the density. The preceding vehicle in the group must be kept in sight.

e. March discipline.—(1) March discipline is defined as that quality, acquired through training and experience in marching, which insures adequate march control; care of equipment; obedience to march restrictions; proper conduct and performance of duty by individuals; correct formations, distances, and speeds; and effective use of cover.

(2) The rapidity of motor vehicle movements necessitates a high state of individual training and march discipline. Control is difficult and much of the responsibility for a successful movement rests with subordinate commanders. Much reliance must be placed upon the judgment of the individual members of the vehicle crew.

(3) March discipline includes—

(a) Proper distance between march serials or between march units.

(b) March units clearing roads at a halt.

(c) Proper distance between vehicles.

(d) Halting in appropriate localities.

(e) Halting or moving on schedule.

(f) Knowing the route of march.

(g) Few accidents.

(h) Establishing traffic control at a halt.

(i) Alertness on the part of car commanders and drivers.

(j) Assisting flow of traffic, both civilian and military.

(k) Driving on the right of the road.

(l) Maintenance of proper speed.

(m) Shifting gears promptly.

(n) Gaining momentum when coming to a steep grade.

(o) Proper loading of vehicles.

(p) Dimming lights.

(q) Using arm or other signals for all changes of speed or direction.

(r) Giving signals correctly.

(s) Personnel remaining concealed when required.

(4) Infractions of the above can be traced to the faulty and inadequate training of individuals and of the small basic elements of the command. Active supervision by the subordinate leaders and commanders will check such faults. Subordinate commanders should "ride the column," constantly observe march discipline during movement, and make prompt correction of violations of march discipline.

(5) Personnel will not be permitted to ride on the outside of vehicles, such as on top of tanks, on running boards, or on hoods. They will not be permitted to ride in such a manner that arms, feet, or legs are hanging outside a vehicle. These practices are not only unsightly and unmilitary, but frequently result in serious injury to personnel.

f. Elements leaving column.—If for any reason a march unit or one of its elements leaves the column, the commander thereof will notify the commander of the next following unit or element. Failure to do this may result in a part of the column becoming separated without the knowledge of the column commander and thus jeopardize the tactical employment of the column as a whole.

g. Refueling.—(1) Personnel should be trained to refuel vehicles quickly. When practicable, extra fuel for the day's march should be carried on the vehicle. Refueling should be done on every possible occasion so that fuel tanks are as full as practicable at all times.

(2) Vehicles are refueled promptly upon arrival at or return to camp or bivouac. When practicable this should be done during daylight hours. However, night refueling should be practiced. No open flames should be permitted within 25 yards of any vehicle being refueled.

h. Disabled vehicles.—A disabled vehicle which cannot keep up with the march will pull to the right side of the road and, if practicable, clear the road. If the vehicle cannot clear the road under its own power, it should be towed or pushed clear. The senior in a stalled vehicle is responsible that vehicles following are promptly signaled to pass, and for control of traffic to avoid accidents and to prevent the rear of the column from jamming. Guards

equipped with red flags or illuminated markers should be posted at some distance to the front and rear of the vehicle when the vehicle cannot be moved entirely from the road.

i. Dangerous crossings.—Motorcyclists of each march unit assist in the uninterrupted and safe march of their unit. When the tail of a march unit passes any critical point not already guarded, such as a traffic intersection or railroad crossing, a motorcyclist remains until relieved by a motorcyclist from the unit next in rear in the column. Some motorcyclists of each march unit march within contact distance of the next preceding march unit. Only in emergencies will railroad crossings or similar danger points be crossed by formed groups of armored elements unless a motorcyclist or guide is posted at the crossing.

j. Maintenance vehicles.—A light maintenance vehicle of each company habitually follows just in rear of the company. When a combat vehicle falls out of column, the light maintenance vehicle pulls in ahead of the disabled vehicle. If it is practicable to reduce the trouble in a short space of time with the tools and parts on hand, the repairs are made and both vehicles move into the column at the first suitable gap and rejoin their companies at the next halt. (See also ch. 3.) If repairs are beyond the scope of the company maintenance, or will take such time that both vehicles will not be able to rejoin their company, the motor sergeant makes a diagnosis of the trouble and leaves the disabled vehicle to be cared for by the regimental or separate unit maintenance which is marching at the tail of the regimental or separate unit column.

k. Separate vehicles.—Under no circumstances should any vehicle other than staff cars, command and control vehicles, motorcycles or emergency vehicles such as ambulances, regain their place in column by passing other elements of the column while such elements are moving. Vehicles traveling independently from the tail toward the head of the column (doubling) will not exceed a top speed of 45 miles per hour.

l. Accidents.—An officer will be detailed to ride at the tail of each column or march serial for the purpose of making a thorough investigation and report on any accident that may occur. This officer is authorized to administer oaths.

m. Security.—Each column commander is responsible for the local security of his own column. (See FM 17-10.)

n. Reports.—(1) March unit commanders will report to the column commander the time the head of the march unit passed the initial point (IP), and the time it passes any designated control point or phase line.

(2) An officer, with suitable transportation and communication facilities, is designated to ride at the tail of the column (march unit or serial). He will report to the column commander the hour the tail clears the IP. He will also report periodically the location of the tail of the column, giving the miles traveled since passing the IP. He also reports to the column commander should an excessive number of combat vehicles drop out of the column and not rejoin. Should radio silence be imposed, motorcyclist and liaison airplanes are used to keep the column commander informed of conditions at the tail of the column.

(3) March units will make hourly reports of their positions expressed in miles from the IP, and at other times which may be specified such as upon arrival at a particular terrain feature.

(4) When the command marches in two or more columns, the force commander will specify the time or place that each column commander will report. These reports include the time of their arrival at, or clearance of phase lines or certain terrain features.

o. Night marches.—(1) Armored units will frequently march at night to avoid air observation and attack. Also the threat of a hostile mechanized attack may cause armored units to march at night. Marches in the combat zone are usually made at night. Night marches will be used frequently when secrecy or surprise is desired and to avoid long range interdicting fires.

(2) Night marches require careful and thorough planning. When hostile observation is active, night marches may be made without lights. When it is desired to march at night without lights, it is better to begin the march without lights or turn lights out at a halt and permit drivers' eyes to become accustomed to the darkness before moving out than to turn the lights out while the column is moving. Marching

on dark nights without lights materially reduces the rate of march of any column. It will vary from 5 miles per hour on poor roads and across country to 10 miles per hour on good roads. When marching at night with lights or in bright moonlight without lights, the rate of march is about the same as marches in daylight.

(3) To maintain close contact and communication between and within march units, distances between vehicles are reduced during night marches. When hostile air attack may be expected, it may be desirable to dispatch groups of about five vehicles with minimum safe distances between vehicles and maintain an average density of about 20 vehicles to the mile. The particular advantage of this method of night movement is, that should the column be attacked, only a small part of the command would suffer losses. This method of movement is predicated on the march objective being secured by friendly troops.

(4) As night marching, under the most favorable conditions is difficult, the following measures should receive careful attention during the planning and conduct of the march. These points have equal application irrespective of the type or method of marching employed:

(a) Issue warning orders.

(b) Make adequate preparations.

(c) If practicable, start the march at dark so all preparations may be made during daylight hours. However, secrecy may require the march to start after dark and that all movement, both on route and in bivouac, cease prior to daylight.

(d) Allow sufficient time for completion of the march during the hours of darkness.

(e) Thoroughly reconnoiter and mark the contemplated route, and in addition reconnoiter alternate routes.

(f) Provide for guides to be posted at points where troops might take the wrong route, to assist troops through congested areas, and at the new bivouac or other march objective.

(g) Provide for security detachments to cover critical points or areas. This may include antiaircraft and anti-mechanized defensive measures.

(h) Provide for adequate communication between march units and between march columns when moving in multiple columns.

(i) Take full advantage of good roads.

(j) Use lights if the situation permits.

(5) During night movements without lights, great care must be exercised in the use of flashlights and other lights. Smoking is prohibited. Any vehicular lights must be so disposed that their beams are not disclosed to air or nearby ground observation. Night driving lights should be used. A shaded light may be placed well under the bed of a vehicle in such a way that the light shines on some surface painted white or other light color. Flashlights should be equipped with a blue lens, or the ordinary lens covered with blue denim, blue cellophane, or other suitable material.

(6) When rapidity of movement is important, driving with lights may be necessary. Normally such a situation would be of short duration and under circumstances where hostile reaction would be too slow to delay the movement or affect the employment of the unit.

p. Factors for good marching.—The following factors insure good marching:

(1) Thoroughly trained personnel in the lower echelons, such as car and tank commanders and drivers.

(2) Proper care of personnel and maintenance of vehicles and equipment.

(3) Thorough preparation which includes route reconnaissance and planning.

(4) Energetic supervision by the commander and his staff.

(5) Good march discipline.

■ 5. HALTS AND BIVOUACS.—*a. Halts.*—(1) The order for the march will provide for halts at stated regular intervals to provide for relief of men and for inspection of vehicles. Usually a halt of 15 minutes is made at the end of the first 45 minutes of marching. Subsequent halts are for 10 minutes and are made at the end of 1 hour and 20 minutes or 1 hour and 50 minutes. The halt for lunch and refueling is usually of 45 minutes to 1 hour duration. The time for the halt is taken from the time leading vehicles of the

march unit stop (not when the commander dismounts) until that vehicle resumes its forward movement.

(2) If the commander of a march unit finds that the time for the scheduled halts will place his command in an unsuitable location, such as a town, unsuitable strip of road, or bridge, he should halt ahead of or behind schedule. Normally a leeway of 1 minute either way for a march unit will not disrupt a march column. If required to continue through a congested area the commander of a march unit can keep going until a halted unit ahead forces him to stop.

(3) If for any reason the column commander decides to halt at other than the specified times, the march units must be promptly notified of the halt and of its duration.

(4) On administrative marches it may be desirable at halts to require the vehicles of each march unit to close to 5 yards' distance. The march units do not close on the preceding march unit. This closing-up of vehicles within the march unit facilitates the inspection of vehicles, issuance of instructions, and correction by platoon and company commanders of errors noted. The closing-up of vehicles within the march unit may in some cases facilitate the passage of traffic en route. *On tactical marches the vehicles do not close at a halt.*

(5) When coming to a halt, vehicles move well over to or off the right side of the road. Traffic control guards, equipped with flags, are posted at the head and rear of the march unit to control passing traffic. Where necessary, intermediate guards will be posted so that adjacent guards are in view of each other. Personnel, other than those used for traffic control, keep to the right of the vehicles. Engines are shut off.

(6) Drivers, especially of full-track vehicles, should be changed frequently. Halts offer an excellent opportunity to make this change. Changes of drivers should not be limited to an exchange of duties between drivers and assistant drivers, but should include all members of the crew. This is especially true on a very long day's march and on marches of several days' duration.

(7) Halt areas for meals must be properly policed prior to departure.

(8) In moving out from halts, speed should be attained gradually. A suggested method is as follows:

First minute at 10 mph.

Next minute at 15 mph.

Next minute at 20 mph.

Gradually to 25 mph.

When halting, the procedure may be reversed.

(9) (a) At halts, full advantage must be taken of any available concealment such as trees, shadows cast by buildings, and shadows adjacent to a large cut or fill. During tactical marches, vehicles may be closed in small groups to obtain cover and concealment, but there should never be less than 50 yards between vehicles. (See FM 17-30, 17-32, 17-33, and 17-42.)

(b) If no natural cover or concealment is available at halts, resort should be made to the use of vehicle camouflage nets or other forms of camouflage, and vehicles should be widely dispersed. They should not be halted in lines or columns.

(c) Upon halting, immediate all around defense is established, observation posted and air and gas alarm warning is provided with each march unit. At least one man must be in the vehicle manning the vehicular weapon.

b. Bivouacs.—(1) In order to avoid unnecessary delay and confusion when entering bivouac or assembly areas, location for subordinate units should be designated prior to arrival of the troops. A representative, with the necessary guides, precedes the column when practical to reconnoiter the area and to meet the unit and conduct it to its area.

(2) Confusion can be avoided if, in assigning areas to subordinate units, the location of the units in the column is considered. Units should not have to move through areas already occupied. Likewise in assigning areas, the order of movement of the units out of the area must be considered.

(3) As soon as a unit arrives in its area, its CP is established and its location is reported to the next higher and lower headquarters.

(4) Routes out of the bivouac must be reconnoitered as soon as practicable.

(5) A march outpost is established by the advance, flank, and rear guards. (See FM 17-10.) An outpost is detailed and relieves the march outpost as soon as practicable. This outpost must be stationed at such distance from the main body that the main body will not be subject to annoyance by the enemy and so it will have ample warning of an impending hostile attack.

(6) Full advantage must be taken of cover and concealment. Vehicle tracks leading into the bivouac area must be brushed out. No lights are permitted at night. Radio is silent and must be silent for at least 1 hour before the bivouac is reached.

SECTION II

RAIL MOVEMENTS

■ 6. GENERAL.—For long distances overland, rail movement of armored force units, irrespective of size, is the most expeditious and suitable method of transportation.

a. Armored force elements can be spared many hours of marching, resulting in additional maintenance and loss of combat efficiency, by using rail transportation when the distance to be covered is long and the readiness of personnel and vehicles for combat is of primary importance.

b. Except for long distances, armored force elements can, where good roads are available, march as fast as they can be moved by rail.

c. Dependent upon the ready availability of railroad equipment, the time required by an armored force unit to prepare for a rail movement, assembly at entraining points, load and secure equipment, clear entraining points, make the actual rail movement, and unload equipment and clear the detraining points, will determine the minimum distance which armored force elements can be moved more rapidly by rail than by marching.

■ 7. REFERENCE TEXTS.—The following manuals contain information relative to movements by rail:

a. FM 25-10 gives information relative to the types of railroad cars suitable for rail movements, preparation of vehicles

for shipment and loading, and methods of securing and unloading of vehicles. (Also see FM 101-10.)

b. FM 100-5 discusses the arrangements, plans, and preparation for a rail movement. It also discusses duties of the commander and tactical aspects that must be considered in such a move.

c. FM 100-10 contains information relative to the general organization, operations, and control of rail movements.

d. FM 101-5 contains forms of orders, check lists for orders, and entraining and detraining tables.

e. FM 101-10 contains detailed information relative to capacities of various types of railroad cars, loading, and other pertinent data.

f. FM 100-15 discusses strategical aspects of rail movements.

■ 8. REFERENCE DATA.—All data are based on Tables of Organization. FM 101-10 furnishes data necessary in computing rail movements of armored force elements.

■ 9. EQUIPMENT REQUIRED.—The following data illustrate the problem involved in the movement of armored force units by rail.

a. An armored division, including attached personnel and equipment, will require about 2,427 cars for a movement entirely by rail.

b. A separate tank battalion, light, will require about 96 cars and a medium battalion about 128 cars.

c. A movement of an armored division in which the track vehicles and the necessary personnel to guard them are shipped by rail and the wheeled vehicles and the remainder of the personnel move by marching, would require about 10 type C and 35 type D trains. A combination of rail and motor movement will probably be the usual method employed in moving armored force units over any considerable distance.

■ 10. LIMITATIONS.—a. Hostile activities will impose many limitations upon the use of rail transportation for armored force movements, and will probably preclude its use except in rear areas.

b. Troops traveling by rail are seriously restricted in resisting attacks. They can do little to protect the rail line from hostile interruption.

■ 11. ANTI-AIRCRAFT DEFENSE.—For additional instructions regarding anti-aircraft defense during rail movements, see FM 100-5. Anti-aircraft protection must be provided at the entraining point, detraining point, and en route.

a. At the entraining and detraining points, anti-aircraft protection may be furnished by anti-aircraft artillery and interceptor aviation. This may be supplemented by anti-aircraft weapons of units entraining or detraining. The following should be observed:

(1) At entraining point—

(a) Keep vehicles concealed and dispersed until cars are spotted and until ready to load.

(b) Have vehicular anti-aircraft gun manned.

(c) Have loading and blocking crews at the train and all blocking material ready before vehicles are brought out from concealment for loading.

(d) Do not jam up vehicles close on road before loading. Have them come forward at such distance that loading will be continuous and without jamming of the column. One hundred yards between vehicles should be adequate.

(e) Block vehicles as rapidly as possible.

(f) *At night do not use lights.*

(2) At the detraining point—

(a) Have vehicular anti-aircraft gun manned.

(b) Unblock vehicles and run them off the cars as quickly as possible.

(c) Move out and gain normal vehicular distance.

(d) Move away from detraining point to a concealed position as rapidly as practicable.

(e) *At night do not use lights.*

b. In issuing orders for the movement, the commander specifies the anti-aircraft measures to be taken en route. These consist of—

(1) Manning vehicular anti-aircraft guns.

(2) Mounting anti-aircraft automatic weapons in flat cars or gondolas.

(3) Attaching some of the attached antiaircraft artillery to each train.

(4) Establishing suitable radio communication with air warning nets.

SECTION III

WATER TRANSPORT

■ 12. GENERAL.—The transportation of armored force units by water employs the same methods, procedure, and organization as does other troops. The difference consists in arrangements which must be made for the loading, shipment, and unloading of vehicles. Equipment that will be required immediately on debarking will be loaded last. The following manuals contain information relative to the movement of armored force units by water:

FM 25-10, Motor Transport.

FM 101-5, The Staff and Combat Orders.

FM 101-10, Organization, Technical and Logistical Data.

TM 10-380, Water Transportation.

FM 31-5 deals with tactical considerations involved in these operations.

■ 13. SUITABILITY OF SHIP AND EQUIPMENT.—When a movement of armored force units by water is contemplated, the capacity of a ship's loading equipment and the size of its cargo doors and hatches are of particular importance. The capacity of the loading equipment assumes added importance when the debarkation may have to be accomplished on a hostile shore. Effort must be made to secure ships with loading equipment (booms, winches, etc.) and cargo doors and hatches capable of handling the larger and heavier equipment of armored force units. When investigation shows that available ships are not suitable, steps must be taken to strengthen the loading equipment, and where practicable to enlarge the hatches and cargo doors.

■ 14. DEBARKATION.—The debarkation of armored force troops must be well planned. If wharfage facilities are not available, barges or scows of a capacity to handle the larger

and heavier equipment must be provided. In the latter case, unloading is dependent upon the capacity of the ship's loading equipment.

SECTION IV

SHELTER

■ 15. GENERAL.—Shelter is defined as “any form of concealment from view, of protection against the elements, or the fire of weapons.”

a. Shelter may be a permanent camp or station; a semi-permanent camp; billets; a shelter camp; a bivouac in which shelter tents and some heavy tentage are pitched in an orderly arrangement; or a bivouac in which a minimum of tentage is erected and where concealment from aerial observation and protection from hostile air and ground attacks are the principal considerations.

b. Billeting for armored force personnel and material in towns and villages will frequently be advantageous, especially for units performing maintenance and supply functions during a campaign.

c. A bivouac may be defined as “an area in which troops rest on the ground with no overhead cover or under natural cover, shelter tents, or improvised shelter.” This section deals principally with shelter of the bivouac type in a tactical situation.

d. The following manuals contain information and data relative to shelter, and are applicable to armored force units:

FM 21-10, Military Sanitation and First Aid.

FM 25-10, Motor Transport.

FM 100-5, Operations.

FM 100-10, Administration.

FM 101-10, Organization, Technical and Logistical Data.

■ 16. BIVOUAC REQUIREMENTS.—a. Bivouac areas for armored force units should provide cover and concealment from both ground and aerial observation; good all-weather standings for all types of vehicles; natural terrain protection against hostile mechanized forces; several entrances and exits to a

good road net; and adequate protected supply routes. A suitable water supply within or near the bivouac area is desirable. The mobility and protective capabilities of armored force units permit more latitude in the selection of bivouac areas than with other arms.

b. The tactical situation and probable plan of employment of armored force units will determine the general location of bivouac areas and the disposition of the units therein.

■ 17. PROTECTION.—General protection of bivouacs is discussed in FM 17-10, 100-5, 17-30, 17-32, 17-33, and 17-42.

a. A judicious utilization of land mines will tend to canalize any hostile mechanized attack and force the attacker to move across terrain that is disadvantageous to this attack.

b. The characteristics of armored force units places them very high on the priority of objectives of hostile aviation, both observation and combat. This indicates the necessity for adequate antiaircraft defense. The armored division does not organically contain the weapons and other material required to provide adequate antiaircraft protection. Such protection, if furnished, will come from GHQ. Therefore, the selection of bivouac areas for armored force units is of importance. Concealment, either natural or artificial, will be sought when in or near the zone of combat. Where adequate natural cover is lacking, recourse will be had to dispersion of units and to the use of camouflage.

c. Camouflage in general is discussed in FM 5-20, 17-10, and 21-45. Where camouflage nets are not available, recourse must be had to material readily at hand. Any regularity of formation must be avoided. Any reflecting surfaces such as bright metal or windshields must be covered with a neutral lusterless paint or with mud. Careless display of white articles of clothing must be avoided. The outline of shadows cast by the object to be hidden must be broken. Shadows cast by trees, buildings, and deep cuts afford excellent protection from observation. However, it must be remembered that the location of the shadow changes with the sun and the movement of personnel and vehicles attracts the attention of observers. Tracks made by vehicles taking cover are frequently the principal means by which the pres-

ence of otherwise well hidden vehicles are disclosed to aerial observers. When branches and boughs are used to camouflage vehicles, they should be secured at some distance and carried to the vehicles. Branches and boughs should be placed in upright position. When placed flat on the object to be hidden they are materially less effective and the difference in texture exposed to an aerial observer is readily noticed. Faded or wilted foliage must be replaced with fresh material. Unless applied by experts, the use of large blotches of paint for camouflaging vehicles is ineffective. The utilization of gulleys and ravines for concealing vehicles from air and ground observation must constantly be borne in mind. However, even though gulleys and ravines provide excellent natural concealment, care must be exercised that suitable routes are available for vehicles to clear rapidly these terrain features. In a tactical situation hostile observation aviation may be expected to operate at altitudes beyond the range of light antiaircraft artillery (above 12,000 feet).

d. Care must be exercised in the use of radio in connection with bivouacs. It is reasonable to presume that the enemy will have listening stations for the purpose of picking up our messages and determining our location. For example, if during a march the commander announces by radio the location of the bivouac area and the enemy should pick up this information, concealment and cover within the bivouac would serve little purpose. If radio transmission is permitted within the bivouac area, hostile position finding radio sets can definitely locate the bivouac position. The use of short range ultra high frequency radio sets does not remove the danger of interception of radio messages.

e. In some situations it will be necessary to impose radio silence within a radius of about 5 miles of a bivouac as well as within the bivouac itself. Resort will be made to the use of messengers and staff officers to disseminate information.

■ 18. ACTIVITIES.—In occupying a bivouac there is a certain order, or routine, in which essential functions must be performed. These functions, in the order of their priority and importance are:

a. Protection of the bivouac area. The establishing of outposts, patrols, and other security measures.

b. Servicing of vehicles.

c. Maintenance of vehicles.

d. Feeding of personnel.

e. Rest for personnel.

■ 19. DEFENSE.—A bivouac area is most vulnerable to hostile attack when troops are moving into the area and when leaving it. This is particularly true of the unit train bivouac.

a. The protection of trains when entering and leaving a bivouac area presents a difficult problem for the train commander. In certain situations, combat elements of the command are detailed to furnish this protection. The security of trains is essential to the continued operation of combat elements, and is the responsibility of the commander of the whole force.

b. A bivouac area is located and occupied so as to permit all around defense. Natural terrain features are utilized to the fullest extent. Units are disposed for mutual support. Outguards are posted at a distance on the probable routes of hostile approach to give timely warning. They may be equipped with radios.

c. When a hostile attack is probable, all vehicles are prepared for combat; plans previously made for the alerting and employment of the command are placed in effect; a part of the force is kept mobile with vehicles and crews ready for action; all probable routes of hostile approach are mined and road blocks prepared and defended.

■ 20. ROUTES WITHIN BIVOUAC.—Prior to occupation of a bivouac or as soon after occupation as practicable, all routes for leaving the area must be reconnoitered and marked. If necessary, new routes of exit are made and marked. There should be at least two good routes available to each regiment. Alternate plans must be made for leaving the bivouac in different directions.

■ 21. MILITARY POLICE.—a. The military police must be informed of the location of the command post of all the principal elements occupying the bivouac.

b. As soon as the circulation map for the bivouac has been prepared the military police will be furnished copies; and they will control traffic as indicated on the map. Prior to issuance of the circulation map by G-4, the military police will handle traffic as directed by the train commander. For discussion of traffic circulation and control see FM 101-15 (when published).

■ 22. ENTERING AND LEAVING BIVOUAC.—This paragraph has general application to all elements of an armored force command, but has particular application to elements of trains.

a. Each march unit moves promptly into its bivouac area without regard to its final vehicular location so as to clear the route of march and not hold up units in rear. Arrangement of vehicles within the bivouac area may be made later. When bivouac areas are entered during the hours of darkness, vehicles are frequently poorly placed due to poor visibility. As there is a natural tendency for vehicles to close distances at night and thus present a very remunerative target, rearrangement of vehicles is made before daylight.

b. Careful planning and training will insure that elements of a command clear a bivouac area promptly and avoid the frequent fault of vehicles being halted, with closed distances, on a road just outside the area. In leaving a bivouac area the following instructions apply:

(1) Warning and movement orders are issued in time to permit the lower elements to complete necessary preparations for the move.

(2) As soon as a march unit which has received orders to move is prepared to start, the fact will be reported. The commander should not have to make inquiries as to the readiness of an element to move.

(3) Each element has a representative contact the element or march unit which will precede it in the column. This representative will cause his commander to be informed of the movement of this preceding element in time to permit his own element to arrive at the IP and not have to halt, but follow the preceding unit at the prescribed distance. This precaution is of particular importance when leaving a bivouac under the cover of darkness.

(4) When the head of a column clears the bivouac it must continue this forward movement.

(5) Prescribed distances between vehicles are maintained at the time the IP is passed.

■ 23. OCCUPATION OF BIVOUACS.—*a.* Bivouacs are occupied by one of two general methods:

(1) When the combat elements of a command bivouac first and the trains are moved to join them.

(2) When the trains bivouac first and the combat elements are moved to that bivouac. Bivouac parties may, therefore, have to be provided by either the combat elements of the command or by the trains.

b. The commander of troops will issue instructions as to the bivouac area, general order of occupation by command, reconnaissance, combat units or trains, general security measures, allotment of areas to subordinate units, and designation of routes to the bivouac area.

c. A bivouac area assigned to a march serial may be subdivided into regimental, battalion, or company areas.

d. When areas have been designated, the commanders of the unit or units concerned will be promptly informed and each will send a representative and the necessary guides to reconnoiter the route and the area and thus be prepared to meet and conduct the unit to its destination without delay.

e. When assigning areas to subordinate units, consideration must be given to the position of the units in the column and the plan for their future employment. It should be borne in mind that a halt should be considered as much in the nature of preparation for the following operation as an opportunity for rest after marching.

f. Entry into bivouac is facilitated by—

(1) Advance parties carrying out a coordinated reconnaissance of the area.

(2) Adequate facilities for traffic control provided at the point where dispersal of units begins.

■ 24. COMMAND POSTS.—*a.* When designating a bivouac area, the commander will indicate the location of the command post. As subordinate units occupy their areas, command

posts are promptly established and report of location made to the next higher headquarters.

b. When practicable, a command post is located near the command post of the next higher unit. A representative of a subordinate unit habitually reports to and remains at the command post of the next higher unit. This representative may be a liaison officer or a messenger. For example, a battalion would send a liaison officer to its regimental or similar command post; a company would send a runner to its battalion to act as company messenger; and in some situations each platoon would have a runner at the company command post. For qualifications of liaison officers, see FM 101-5.

■ 25. STRAGGLER POSTS.—a. Straggler posts are defined as “the point at which straggling vehicles or personnel are directed to proceed, and where they are assembled into groups to be conducted to their units.” (See FM 17-10.) Location of these posts are announced by the march column or higher commander.

b. Straggler posts are located on the route of the march column and at the point where the march column starts its dispersal for the units to enter their bivouac areas. It may be located at the *meeting point*.

■ 26. MEETING POINT.—A meeting point is defined as “the point at which guides meet their units or transportation.” Meeting points and straggler posts have application in connection with the occupation of bivouacs. They are of particular importance to armored force troops.

■ 27. CONTAMINATED VEHICLE AREA.—a. When establishing a bivouac, provision will be made for an area to be used for the decontamination of vehicles which have been subjected to gas attack.

b. This area, preferably at least $\frac{1}{2}$ mile down wind from the bivouac, will be plainly marked and will be conveniently located near the road entering the bivouac. Its location must be known to unit guides and military police. (See FM 21-40 and 17-59.)

■ 28. PARKING OF VEHICLES.—a. When a bivouac area is occupied, vehicles are so arranged that individual vehicles

may be moved for maintenance or other purposes, and so that they may leave the area expeditiously.

b. Combat vehicles are so arranged that they do not interfere with the free movement of supply and service vehicles.

c. Personnel will not be permitted to sleep under or immediately in front of vehicles. As soon as vehicles are parked, slit trenches will be dug, one trench for each two men.

d. To minimize the effect of air attack it is desirable to protect the engines, transmissions, and differentials of unarmored vehicles by sandbags or by digging a trench for each vehicle, depending upon the ground. A sloping trench, 3½ feet deep for the engine and 1½ feet deep for the differential, furnishes adequate protection.

■ 29. SUMMARY.—Factors bearing on a suitable bivouac for armored force units may be summarized as follows:

- a. Adequate size.
- b. Good cover and concealment.
- c. Good standings.
- d. Natural defensive features.
- e. Readily defended.
- f. Protected supply routes.
- g. A good road net (for occupation of, circulation within, and departure from the bivouac area).

CHAPTER 2

SUPPLY

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SECTION I

GENERAL

■ 30. GENERAL.—*a.* The basis of supply of armored units as well as useful planning data are found in the following publications:

FM 100-10, Administration.

FM 101-10, Organization, Technical and Logistical Data.

FM 101-5, The Staff and Combat Orders.

FM 9-5, Ordnance Service in the Field.

FM 10-10, Quartermaster Service in Theater of Operations.

Tables of Organization, Armored Force.

Tables of Basic Allowances.

b. Detailed information concerning the functions of the armored division service units in the procurement and distribution of supplies and furnishing of services will be found in the following Field Manuals:

FM 17-45, The Armored Engineer Battalion.

FM 17-57, The Supply Battalion, Armored Division.

FM 17-58, The Armored Maintenance Battalion, Tactical Employment.

FM 17-70, Armored Signal Company.

FM 17-80, Medical Units, Armored Force.

■ 31. RESPONSIBILITY.—*a.* Supply is a command function; it is the duty of every commander to insure adequate supply for the elements of his command. In the armored division, as in the infantry and the cavalry divisions, the commander is assisted in this important function by the supply and evacuation section (G-4) and the appropriate special staff sections. The duties of these sections are discussed in section V and in FM 101-5.

b. If an armored division or separate tank battalion is attached to a larger unit, it is the responsibility of the larger unit to establish supply points within practicable hauling distance. This distance should not exceed 35 miles on ordinary roads from the bivouac of the most distant unit to these supply points. If roads are bad the distance must be shorter.

c. Frequent missions for armored troops are to disrupt the supply lines of the enemy, to hamper his evacuation, and to destroy his communication. To accomplish these missions, supplies frequently must be pushed beyond existing rail or road facilities. This presents a tremendous problem for the army supply services and engineers. While it is the responsibility of the army to push supplies within practicable hauling distance of the division, anticipatory planning by the division G-4 to determine the probable requirements for the operation and coordination with Army G-4 will insure an adequate flow of supplies without which no armored operation can be successful.

d. The armored division obtains its supplies directly from army supply points. The armored corps is an administrative agency for corps troops only and is not in the chain of supply except when acting independently. The corps also secures its supplies from army.

e. Due to the high mobility of the armored division, its sensitiveness to supply and the great distances covered in operations, its supply system must be flexible and transportation must have the same mobility as the supported troops. Normal methods of supply must be modified to give the required flexibility and mobility. To this end, all supply officers in the division must prepare alternate supply plans

for their supply echelons in which consideration is given to the following:

- (1) Alternate supply routes.
- (2) Rapid forward displacement of supply installations.
- (3) Losses of supplies, supply vehicles, and personnel.
- (4) Variations made necessary by tactical groupings.
- (5) Protection of trains and supply installations.
- (6) Necessity for fighting in moving supplies forward.
- (7) Dumping of nonessential loads to provide additional trucks.
- (8) Development and utilization of local resources.

■ **32. CLASSES.**—Classes of supply are defined in FM 100-10. In the armored division, classes of supply may be defined briefly as follows:

Class I: Rations and water.

Class II: T/BA Equipment and Table of Allowance Equipment.

Class III: Fuel and lubricants.

Class IV: Spare parts, fortification and construction materials.

Class V: Ammunition, pyrotechnics, antitank mines and chemicals.

■ **33. METHODS.**—*a.* The fuel, lubricants, ammunition and ration supplies of the division are carried in the regimental and separate battalion trains. The only division supplies carried in the division trains are a small rolling reserve of ammunition carried in the 96 trucks and trailers of the division supply battalion, a total of 336 tons of ammunition. In addition to ammunition, a small amount of spare parts for motor vehicles and a few medical, signal, and engineer supplies are carried in the maintenance, medical, signal, and engineer battalion trains. No extra fuel or rations are carried in the division trains. Consequently railhead or truckhead distribution is the normal method of supply. For definition and discussion of railhead distribution, see FM 100-10.

b. If sufficient cargo transportation is attached to make the division self-sustaining for a period of time, dump distribution or unit distribution may be found advisable. (See FM 100-10.)

c. The necessity for supply by air transport must always be considered as an emergency measure. Supplies by air may be delivered by transport airplanes at airdromes in possession of the division or by parachute or glider at marked areas protected by the division.

d. In protracted operations in theaters where it is impossible or impracticable to establish railheads or truckheads within reach of the division, unit distribution may be effected by relays of type load motor trains directly from army supply points. These type loads should contain a predetermined amount of class I, III, and V supplies for each unit of the division. The unit sections are dispatched to units with guides and necessary protective elements from the division control point.

e. Army or GHQ may provide a division rolling reserve of type loaded supply vehicles for unit class III and V supply. Under this system, each fuel, lubricant, and ammunition supply vehicle has its counterpart in the division rolling reserve. When this system of supply is in effect, empty supply vehicles of units may be sent either by infiltration or in convoy, through the bivouac of the rolling reserve to the army supply point for refill, thus releasing an equal number of similarly loaded trucks from the rolling reserve. Trucks refilled at the army supply point rejoin the rolling reserve. An exchange of drivers may be made at the bivouac of the rolling reserve.

■ 34. SUPPLY ORGANIZATION.—a. The supply channels of an armored division are shown in figure 1. The special staff officers having supply functions are the division quartermaster, division ordnance officer, division engineer, division chemical officer, division surgeon, and division signal officer. G-4 is not an operating supply officer; all supply in the division is handled by the appropriate special staff section. (See sec. V.)

b. Organization of the various supply units of the armored division is shown in the appropriate Table of Organization.

c. Typical organization charts showing control of various supply and maintenance echelons in combat are shown in figures 3 to 8, inclusive.

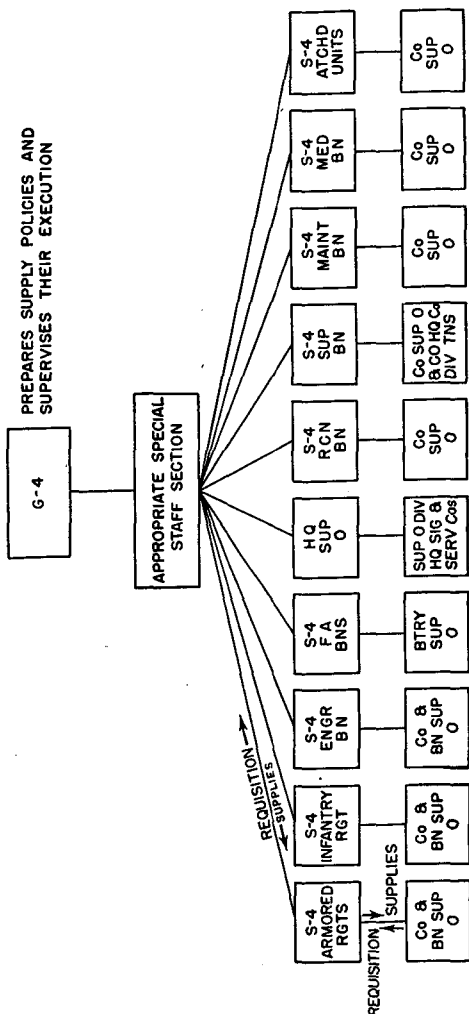


FIGURE 1.—Diagram of supply channels in the armored division.

■ 35. TRAINS.—*a. Unit.*—(1) Unit trains used primarily for supply, evacuation, and maintenance are subdivided into two echelons, A and B. Echelon A includes vehicles which are essential for combat, such as company maintenance, fuel, lubricants, and ammunition trucks. Echelon B includes vehicles which are not essential for combat such as kitchen, combat equipment, and ration trucks. (See fig. 2.) Echelon A vehicles normally operate from the unit service park. Echelon B and division trains normally operate from the protected area of division trains. These groupings are not to be regarded as inflexible as the tactical situation will often dictate a change in composition of train echelons.

(2) On the march and in combat, organization (company, battery) trains are usually consolidated under unit control. They may be further consolidated under combat command or division control. They may be released, as the situation warrants, for feeding troops, drawing rations, fuel and ammunition, etc., but they should revert to unit or division control prior to movement of the unit.

(3) Organization maintenance sections are habitually released.

(4) On the march and in combat, unit B echelon trains are normally consolidated under division control. (See fig. 2.)

(5) Unit A echelon trains are habitually released.

(6) Reconnaissance battalion kitchens and A echelon trains are habitually released.

(7) Trains under unit control move by bounds from one concealed position to another. *Moves are limited to those necessary to give adequate support to the unit.*

(8) (a) When elements of a command are detached, the commander of the force to which they are attached becomes responsible for their supply.

(b) Upon receipt of orders detaching an element of his command, the commander will immediately detach the corresponding train sections which supply that element.

(c) The commander to whom attachment is made will attach the element and its trains for supply to the major unit of his force.

(d) Should the trains referred to be under division control, the train commander will see that proper attachments are

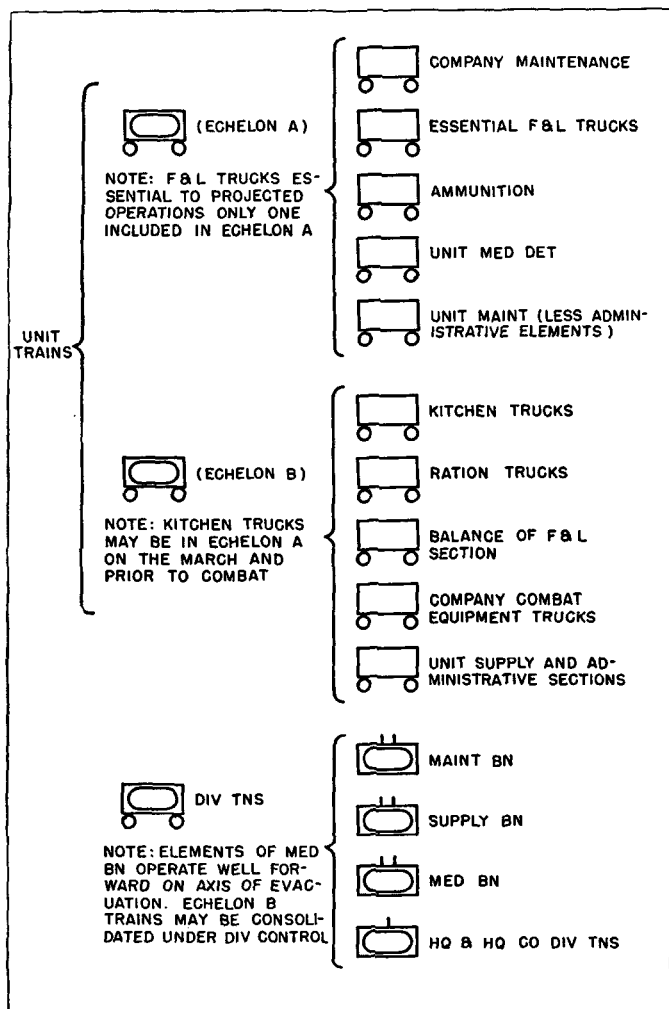


FIGURE 2.—Normal train organization, armored division.

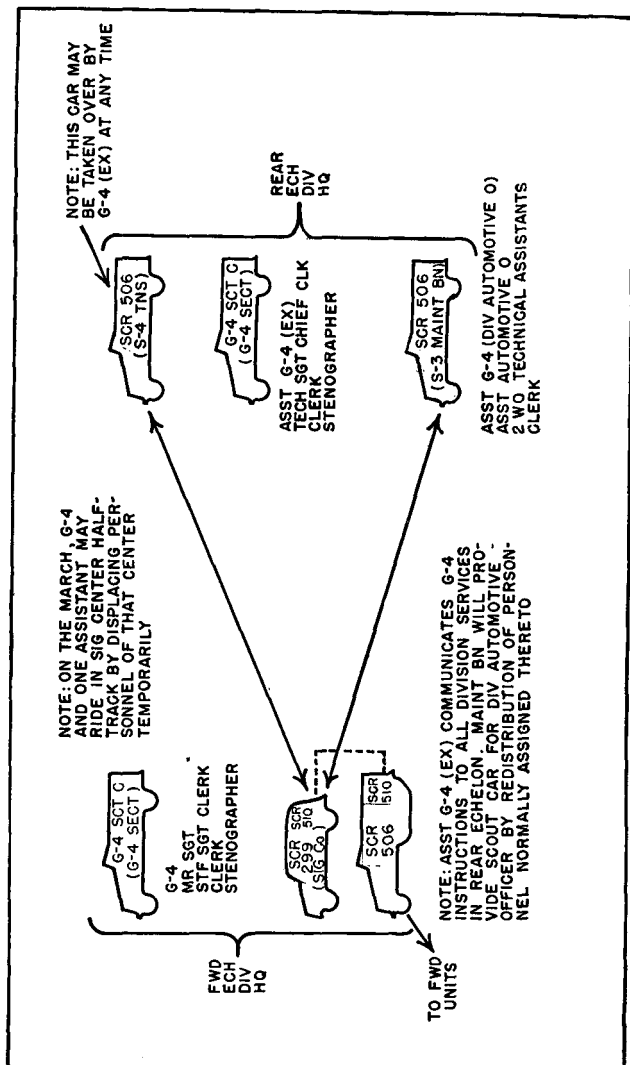


FIGURE 3.—Organization chart, division G-4 section

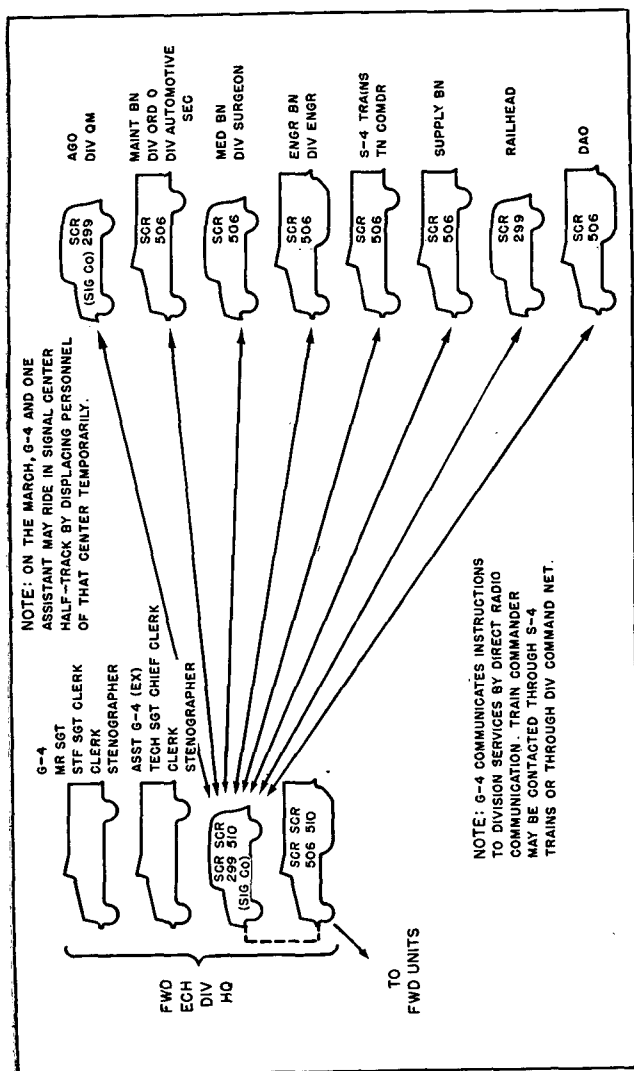


FIGURE 4.—Alternate organization and control chart, division G-4 section.

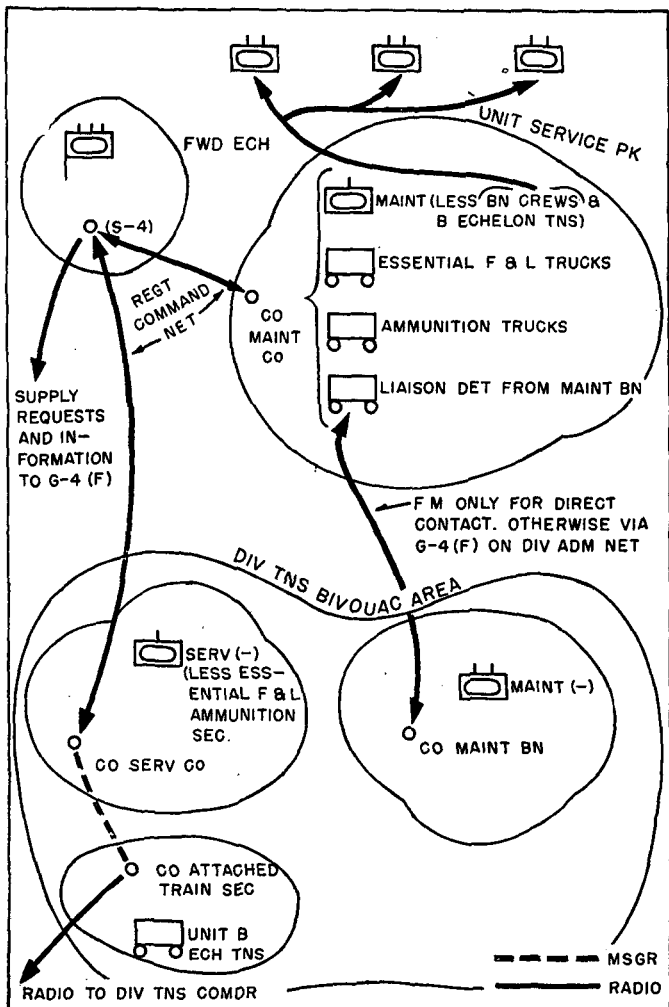


FIGURE 5.—Supply and maintenance control, armored regiment.

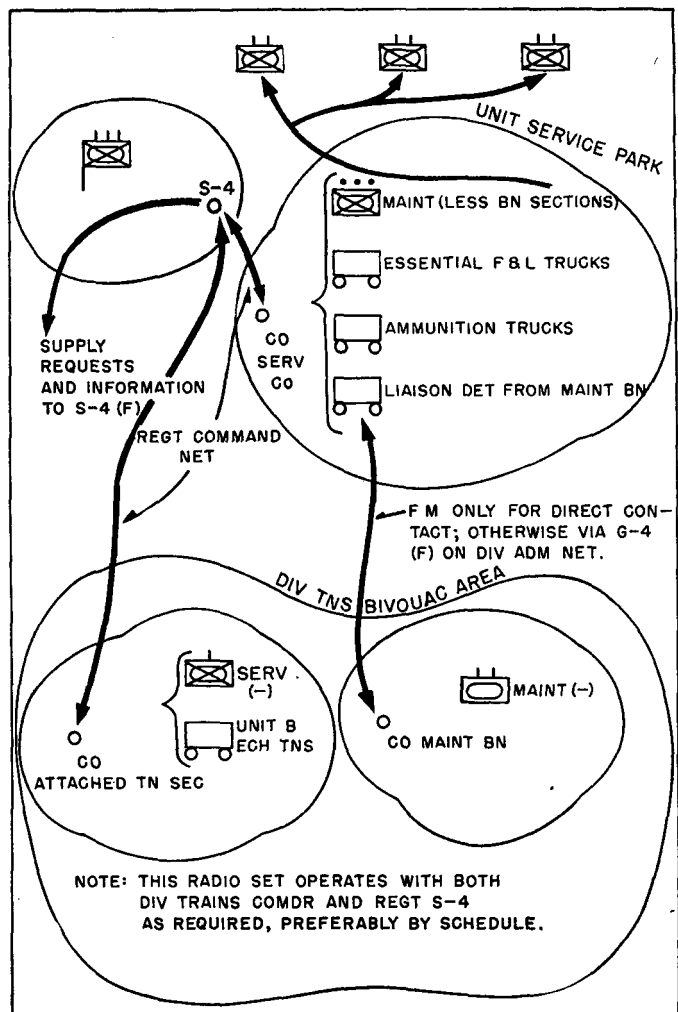


FIGURE 6.—Supply and maintenance, armored infantry regiment.

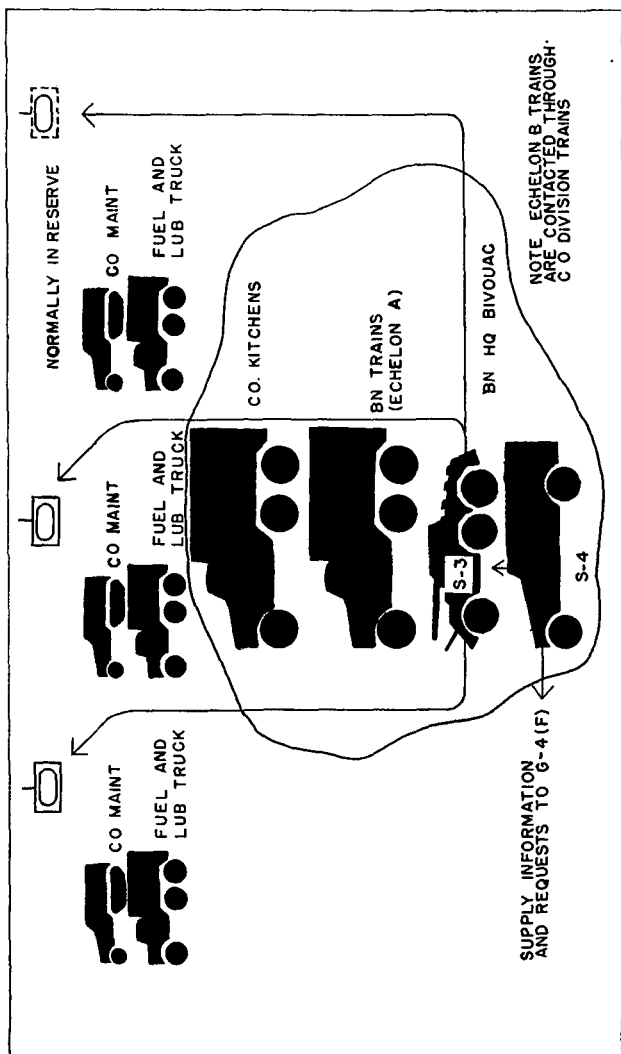


Figure 7.—Supply and maintenance control, reconnaissance battalion.

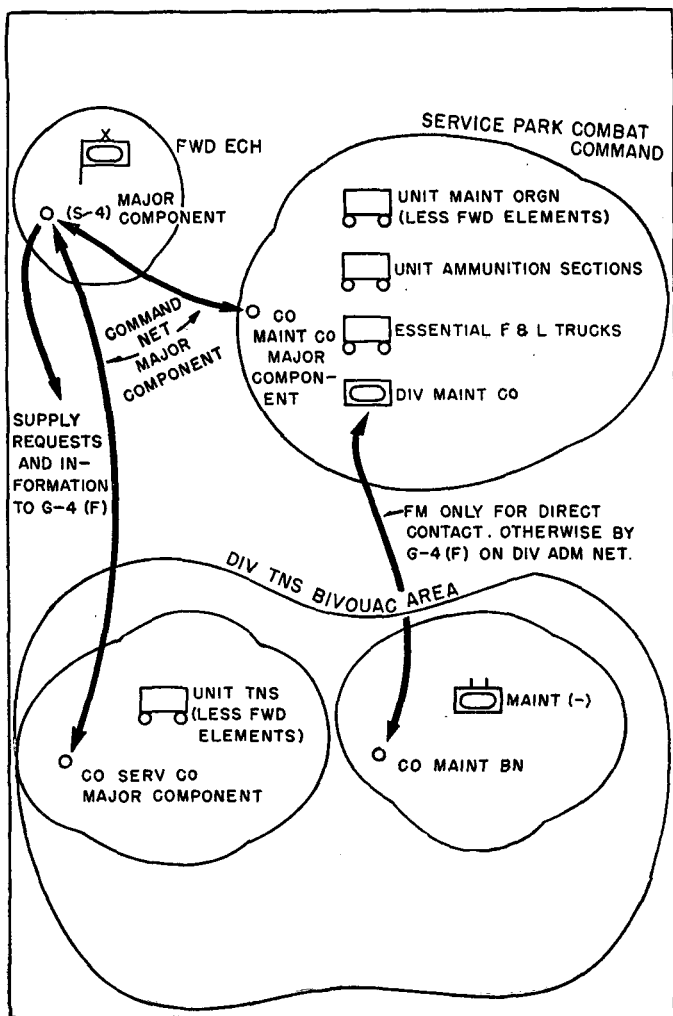


FIGURE 8.—Supply and maintenance control, combat command.

made upon receipt of attachment orders. It is the duty of the supply officer of the parent unit to see that train sections of detached elements join the trains of the major element of the force to which attachment is made.

(e) Unless otherwise provided for, the S-4 of the major element assumes the duty of supplying all attached units.

(f) The headquarters commandant is responsible for necessary attachments of trains of major combat element of combat command and headquarters trains.

(g) The necessary adjustments caused by attachments are made by division special staff officers at all railheads and dumps.

b. *Division*.—See FM 17-55.

SECTION II

IN ZONE OF THE INTERIOR

■ 36. **GENERAL**.—a. The following publications will be found useful guides for the supply and administration of armored units in garrison:

Tables of Organization, Armored Force.

Tables of Basic Allowances Nos. 5, 6, 8, 11, 17, and 21.

Table of Allowances No. 20.

Allowances of Expendable Supplies, Circular No. 1-18, O. Q. M. G.

Accounting Procedure for Organization Property, Circular No. 105, W. D., 1942.

Disposition of Clothing turned in and Issues of Clothing, Circular No. 147, W. D., 1942, as changed by subsequent circulars.

Rations, Circular No. 195, W. D., 1941, as changed by subsequent circulars.

Training Allowances of Ammunition, AR 775-10.

b. Occasional problems not covered by the above publications may arise which will require reference to pertinent Army Regulations. AR 1-10 will aid in finding the appropriate regulations.

■ 37. **CLASS I**.—a. The issue of rations is covered in Circular No. 195, W. D., 1941.

b. Rations for the division are drawn in bulk from the

post quartermaster by the subsistence section of the division quartermaster platoon. This section breaks the bulk ration into unit rations for the regiments, separate battalions and separate companies, and issues them to the unit supply sections at class I supply point. The unit supply sections in turn break the ration into company lots and issue to the companies. Ration cycle normally starts with breakfast.

■ 38. CLASS II.—Garrison class II supplies fall into three general categories, Tables of Basic Allowances, Tables of Allowances, and Allowances of Expendable Supplies. Tables of Basic Allowances (T/BA) list supplies and equipment to be taken into the field by the organization. Tables of Allowances (T/A) list supplies and equipment which are not normally taken into the field but are for use in post, camp, or station. Allowances of Expendable Supplies list expendable supplies issued for the use of troops in the field and in garrison, such as stationery, office supplies, and cleaning and preserving material.

a. Initial issue.—Initial issues of T/BA supplies are automatic. Initial issues of Tables of Allowances and expendable supplies are obtained on requisition through the appropriate division special staff section. (See also par. 42 for controlled items.)

b. Replacement items.—After initial allowance of equipment has been received by an organization, the regimental or similar unit supply officer will thereafter obtain replacements of articles of such equipment, except individual clothing and equipment, as follows:

(1) *Expendable articles.*—(a) By direct exchange on presentation to the station supply officer of the unserviceable article.

(b) By requisition for expendable spare parts, tools, etc., accompanied by certificate to the effect that the articles are required to complete an authorized set or to replace those which cannot be presented for exchange for reasons stated.

(c) By requisition for supplies issued on an allowance basis.

(2) *Nonexpendable articles.*—(a) On presentation to the station property officer through either or both the unit supply

officer and custodial officer of a complete voucher covering the article or articles, such as a statement of charges, inventory and inspection report, or quarterly dropping allowance certificate. (See Cir. No. 105, W. D., 1942.)

(b) By direct exchange of unserviceable articles or component parts accompanied by certificate that the unserviceable condition is due to fair wear and tear. If the station property officer is not satisfied that the unserviceable condition is due to fair wear and tear he may require that the certificate be approved by the commanding officer of the unit.

(3) Repair materials will be issued on requisition on which a certificate is placed to the effect that the material requisitioned is to replace material that has been used in the repair of Government property. Tools and parts not included in repair sets will be exchanged in the same manner, provided the organization has facilities to install such parts, otherwise they will be installed by the supply arm or service concerned. Nothing in the foregoing prescribed method of replenishment of equipment will be construed as limiting in any way the number and amount of spare parts that are to be exchanged or to sanction periodic allowances. The guiding principle will be to provide parts for maintenance of the authorized allowances of equipment. Damaged parts presented for exchange will be exchanged regardless of the number included in the set provided that the total number of spare parts or tools authorized to be on hand in any organization is not exceeded. The accumulation by organizations of stocks of spare parts, repair materials, and tools in excess of allowances is prohibited.

(4) For replacement of individual clothing and equipment see paragraph 48.

c. Property for garrison use only.—Items which are to be used by the company only as long as it is in camp or garrison and returned before entering upon field duty, are issued on a loan basis by the post or camp quartermaster. The company commander will secure these items through his unit supply officer from the post quartermaster or the custodial officer if one has been appointed under the provisions of Circular No. 105, W. D., 1942.

■ 39. CLASS III.—*a.* Fuel and lubricants are purchased by the post quartermaster.

b. Fuel is dispensed to units from unit pumps or otherwise as local conditions dictate.

c. Lubricants are dispensed to organizations through unit supply officers by the division quartermaster.

d. There is no formal accounting for fuel and lubricants consumed. They are expendable supplies and are dropped from quartermaster accountability on W. D., Q. M. C. Form No. 437 (Delivery Order and Receipt) signed by the unit supply officer. A record of issue of fuel and lubricants will be maintained within the division as follows: from the division quartermaster to unit supply officers, from unit supply officers to organizations, and from organizations to individual vehicles.

■ 40. CLASS IV.—*a.* Automotive parts, accessories, unit assemblies, and supplies furnished with the vehicle will include sufficient parts to provide initial stocks in all echelons of maintenance to and including the medium maintenance organizations as prescribed by authorized lists. Units will automatically be supplied with initial stocks of automotive parts and supplies appropriate to their echelon of maintenance, in accordance with authorized lists prepared or approved by the Chief of Ordnance. These automotive parts and supplies are a part of the organizational equipment of the unit to which issued.

b. Replacements of stocks indicated in *a* above are obtained by requisition through the next higher echelon of automotive parts supply.

c. Parts and unit assemblies needing replacement will be replaced by exchange of the worn part for a new one at the appropriate echelon repair shop. Parts turned in should be accompanied by a certificate of fair wear and tear, statement of charges, or a statement that the item is on survey as may be required by the circumstances.

d. Ordnance spare parts, other than for combat vehicles, are supplied without requisition with the weapon. Replacements are obtained as outlined in *c* above.

e. Miscellaneous class IV supplies not covered above are

obtained by requisition through the appropriate division supply section.

■ **41. CLASS V.**—Training ammunition allowances are prescribed in AR 775-10.

a. Under present supply policies and procedures, the Chief of the Armored Force is responsible for the supply of training ammunition to all units assigned or attached to the Armored Force.

b. Monthly allocations are made to all units and installations by the Chief of the Armored Force predicated on training requirements and in accordance with instructions issued by Army Ground Forces.

c. Upon receipt from the Chief of Ordnance of established credits at the various depots, the Chief of the Armored Force, through his ordnance officer, directs shipments of allocations to all units and installations under his control without action on the part of the unit or installation concerned. This is accomplished by means of teletype and confirmed with W. D., Q. M. C. Form No. 400 (Requisition). Copies of these requisitions are forwarded to the commanders of the units and installations concerned, and, in addition, copies are furnished the ordnance officer of the station where the recipient is located. These requisitions serve as advance notice of shipments and may be used as a basis for securing advance issues from available post stocks. Otherwise distribution must await arrival of allocation from the depot.

d. Division and separate unit commanders may allocate ammunition within their units in the best manner conducive to proper training.

e. Requests for additional ammunition will be referred to the Chief of the Armored Force for necessary action.

■ **42. CONTROLLED ITEMS.**—A list of items of equipment whose issue is controlled by the War Department is issued from time to time. Requisitions for shortages in initial allowances of these items will not be submitted nor will follow-up correspondence be initiated as prescribed in paragraph 49. However, replacements for controlled items will be requisitioned in the normal manner. Shortages in accessories for controlled items will be requisitioned at once.

■ **43. CREDIT ITEMS.**—Lists of chemical warfare, engineer, medical, ordnance, quartermaster and signal items of equipment and supplies whose issue is controlled by the War Department by a system of depot credits, are published from time to time. Under this system, post, camp and station supply agencies are given depot credits against which requisitions are made to supply the needs of the garrison. This method of supply eliminates the necessity of maintaining large post stocks.

■ **44. FORMS USED IN REQUISITIONING.**—*a.* Requisitions for supplies and equipment will be made on Form No. 400 irrespective of the source whence the property is to be obtained, or the character of the property requisitioned, except where other specific blank forms are prescribed for requisitioning particular classes of property. The authorized exceptions to the foregoing rule are as follows:

(1) **W. D., A. G. O. Form No. 35 (Individual Clothing Slip)** will be used in making requisitions for clothing to be issued to individual enlisted men.

(2) **W. D., Q. M. C. Form No. 409 (Requisition and Receipt for Clothing in Bulk).**

(3) **W. D., Q. M. C. Form No. 411 (Requisition and Receipt for Brooms, Matches, etc.).**

b. The blank forms prescribed in *a* above are provided for convenience in submitting requisitions. A requisition prepared on any paper will be accepted as a proper and valid requisition by a supply arm or service, provided that the essential data are shown thereon. (See AR 35-6540.)

■ **45. WHERE COMPANY SUBMITS REQUISITION.**—Requisitions for Tables of Basic Allowance equipment, except individual clothing and equipment of enlisted men required by companies or similar units whose regiment or battalion is organically provided with a supply officer, will be submitted by the company or similar unit commanders in triplicate to such supply officer, who will sign and return one copy as acknowledging thereon its receipt. Pending publication of AR 35-6570, see Circular No. 105, W. D., 1942.

■ 46. CHANNELS FOLLOWED BY REQUISITIONS.—Pending publication of AR 35-6570, see Circular No. 105, W. D., 1942.

■ 47. WHEN REQUISITIONS ARE SUBMITTED.—*a. For replacement.*—When authorized company or individual equipment is lost, damaged, or destroyed while in the hands of the company, a requisition normally would not be submitted, since replacement would be secured by direct exchange or other methods referred to in paragraph 38c. However, when time is urgent, requisitions may be submitted for replacement items pending final action on W. D., A. G. O. Form No. 15 (Report of Survey) or W. D., I. G. D. Form No. 1 (Inventory and Inspection Report).

b. For expendable items.—Requisitions for stationery, office supplies, cleaning and preserving material, etc., will be requisitioned by company commander at such times and for such periods as directed by his unit supply officer.

c. For individual clothing.—As directed by unit supply officer or post quartermaster, clothing in bulk will be drawn on Form No. 409 to replace items turned in at periodic inspections. In case clothing is required immediately for one or a few enlisted men, Form No. 35 will be prepared in duplicate and submitted to the unit supply officer.

■ 48. FOLLOW UP ON REQUISITIONS.—If within 10 days after submitting a requisition a requisitioning officer has not received advice of the action taken, he will institute a tracer and forward it through the same channels as the requisition. All officers concerned are charged with the necessary follow up to assure efficient supply. (See Cir. No. 1-6, OQMG.)

■ 49. GUIDE FOR COMPANY COMMANDER IN SECURING CERTAIN ITEMS.—*a. Organizational equipment* (Tables of Basic Allowances).—(1) *Vehicles.*—Initial issue is effected by the Chief of Ordnance without requisition in order of priority of organizations established by the War Department. Replacement of unserviceable vehicles is accomplished as prescribed in paragraph 38.

(2) *Spare parts.*—Initial issue without requisition. Replacements by direct exchange or by requisition on Form No. 400.

(3) *Tool kits*.—Initial issues are secured automatically without requisition. Replacement of individual hand tools are secured by direct exchange or presentation of statement of charges, report of survey, or approved requisition.

(4) *Axes, lanterns, buckets, etc.*—Initial issue is secured without requisition. Replacements are made by direct exchange, or presentation of statement of charges, etc.

b. Individual clothing and equipment.—Quartermaster clothing and equipment, Table of Basic Allowance No. 21; equipment furnished by other supply services, Table of Basic Allowance No. 17.

(1) *Gas masks (CWS equipment)*.—Initial issue is secured without requisition. Replacements are made by direct exchange of unserviceable masks. Lost or destroyed masks will be replaced by submission by company commander through the unit supply officer to the chemical officer of an approved Form No. 15 or Form No. 1.

(2) *Overshoes (quartermaster equipment)*.—Initial issues are secured by requisition on the unit supply officer. Replacements are made by direct exchange.

(3) *First-aid packets*.—Initial issues are secured by requisition on the unit supply officer. Since this item is marked as "expendable" in Tables of Basic Allowances, replacement will be procured by requisition on the unit supply officer immediately upon discovering a shortage.

(4) *Shoes, socks, shirts, etc.*—Troops reporting for duty from reception centers will have in their possession a large part of required clothing. The balance as required by Table of Basic Allowance No. 21 will be secured by submitting Form No. 409 to the unit supply officer. Replacement of clothing is usually accomplished by having the troops in each company present their unserviceable clothing to the supply room once monthly, where it is inspected. Items which cannot be repaired are replaced by requisitioning in bulk as above, issued to individuals on Form No. 35, and recorded on Form No. 32 of the individual receiving the items. When an individual soldier requires immediate issue of clothing, this may be accomplished by filling out Form No. 35 and presenting the accomplished copy to post quartermaster.

c. Expendable supplies not listed in Table of Basic Allowance.—(1) *Motor fuel and lubricants.*—See paragraph 39.

(2) *Stationery, paper clips, pencils.*—These are secured by periodic requisitions on the unit supply officer in quantities prescribed in numbered circulars of Office, Quartermaster General. (At time this is published, Cir. 1-18, OQMG.)

(3) *Brooms, toilet paper, paint.*—These are secured in same manner as stationery.

(4) *Ammunition for training purposes.*—These are secured by requisition on the unit supply officer in accordance with allowances prescribed. (See par. 41.)

(5) *Cleaning and preserving materials.*—These are secured by requisition on unit supply officer in accordance with Tables of Allowances of cleaning, preserving and lubricating materials, recoil fluids, special oils, and similar items of issue; and SNL K-1.

d. Property for garrison use only (Table of Allowances for posts, camps, and stations).—(1) *Aprons, desks, pillows, refrigerators, etc.*—These are secured by requisition on the unit supply officer, or as directed, either through the custodial officer or directly from the post quartermaster with or without requisition. These items are secured on loan only, and are held on memorandum receipts from post quartermaster to custodial officer or as otherwise directed by post commander. Allowances are prescribed in Tables of Allowances for posts, camps, and stations. Replacements of articles on memorandum receipt of total value not to exceed \$20 may when worn out through fair wear and tear be exchanged for like articles when accompanied by a certificate that the unserviceable condition is due to fair wear and tear. (AR 35-6540.)

(2) *Chinaware, glassware, kitchen utensils.*—Initial issue is secured as above. Replacements are secured within limits of quarterly breakage allowance of 5 percent of total money value of authorized issues. (See AR 35-6620.)

(3) *Electric bulbs.*—The initial issue is as prescribed in Table of Allowances for posts, camps, and stations. Replacement is made on presentation to post quartermaster of unbroken bulbs accompanied by a certificate of fair wear and tear.

■ 50. **REPORTS OF SURVEY.**—For detailed instructions and information as to when required, see AR 35-6640.

■ 51. **INSPECTION AND INVENTORY REPORT.**—For detailed instructions see AR 20-35 and Circular 105, W. D., 1942.

SECTION III

ORGANIZATION AND OPERATION OF OFFICE OF UNIT SUPPLY OFFICER

■ 52. **PERSONNEL.**—The battalion or regimental supply officer, hereafter referred to as unit supply officer, is the S-4 on the staff of the battalion or regimental commander. As such he is charged with preparation of policies for, and the supervision of arrangements for supply, evacuation, transportation, and other administrative matters related thereto.

■ 53. **DUTIES OF UNIT SUPPLY OFFICER.**—*a.* The specific duties of the supply and evacuation section (S-4) are defined in FM 101-5 and may include, in addition to many other duties, the planning for and supervision of activities concerning—

- (1) Procurement, storage, and distribution of all supplies.
- (2) Maintenance of equipment.
- (3) Property responsibility.

b. W. D. Circular No. 105, which will be superseded by AR 35-6570 prescribes a simplified property procedure which delineates the operations of the office of the unit supply officer in accomplishing its function.

■ 54. **RECORDS.**—To accomplish his many duties, the unit supply officer has very little assistance, consequently paper work must be kept at a minimum. Certain records, however, must be maintained.

a. Jacket file.—(1) *Action completed.*—A manila folder or large envelope, one for each company, will serve the purpose of a handy file for shipping tickets, requisitions, etc., pertaining to property of a company, and upon which deliveries have been completed.

(2) *Action pending.*—A file as above for requisitions, etc., upon which deliveries have not been completed, or final action taken.

b. Requisition register.—Some handy form of register of

requisitions consolidated and initiated in office of unit supply officer must be maintained, with indication of action taken to date.

c. Requisition file.—A single board file of retained requisitions.

d. Additional.—Practice will indicate any additional records which might facilitate the supply officer's work. Duplication of records, however, should be avoided.

■ 55. ASSISTING COMPANY COMMANDERS.—The unit supply officer is the advisor to every company commander on methods of obtaining supplies, maintaining records, and accomplishing forms.

■ 56. MAINTENANCE OF EQUIPMENT.—The unit supply officer will make inspections as directed by the unit commander to ascertain that each company is fully equipped and that equipment is in serviceable condition.

■ 57. ECONOMY.—The unit supply officer will enforce economy by checking by means of the jacket file quantities requisitioned by each company.

SECTION IV

IN THEATER OF OPERATIONS

■ 58. PURPOSE.—The purpose of this section is to outline the general methods of supply of an armored division in the theater of operations. Methods outlined in this section are designed as a guide only and are not to be followed blindly. Situations will arise which will make variations from normal procedure necessary. A thorough knowledge of supply methods outlined in FM 101-10, and 100-10 will enable the supply officer to suit his supply methods to the tactical situation.

■ 59. PROPERTY ACCOUNTABILITY.—*a.* Property accountability in the theater of operations will be prescribed by the theater commander.

b. In the combat zone the methods of accounting for property will conform to the provisions of FM 100-10.

c. While it is not required that units keep a record of the status of property in the combat zone, it will be necessary for supply officers to know the approximate status of T/BA property in order to maintain the prescribed allowances. An informal record may be kept in the T/BA showing existing shortages in equipment in order to facilitate preparation of requisitions for resupply.

■ 60. CLASS I.—a. Figure 9 shows the ration situation in the division after supper. Figure 10 shows the ration situation in the division after breakfast. Unless otherwise announced, the ration cycle begins with supper. When type A or B ration is available, a cooked lunch is issued to the individual at breakfast. Unit ration sections issue rations to kitchens normally after supper and proceed at once to class I supply point to refill. Unit kitchens thus carry a maximum of one and two-thirds and a minimum of two-thirds rations. Ration sections carry normally one ration plus replacements of C and D rations required by units.

b. Unit personnel officers submit a strength return as of midnight daily to the division adjutant general who, in turn, sends a consolidated return to division quartermaster. This return forms the basis for the daily telegram submitted by the division quartermaster. (See sec. V and FM 17-57.)

c. Figure 11 shows graphically the method of class I supply normally used in the division. Other methods are discussed in FM 101-10 and sections I and V. Any combination or variation of these methods may be used if the situation permits. The guiding principle is to make the most efficient use of available transportation to effect the timely delivery of rations to the troops. Replacements of types C and D rations are effected by requisition on the division quartermaster by unit S-4's.

d. Schedules should be announced for ration distribution to units in order to avoid congestion in the area. If schedules are not announced, traffic must be carefully controlled and vehicles must avoid bunching in order not to present a favorable target for air attack or to direct attention of

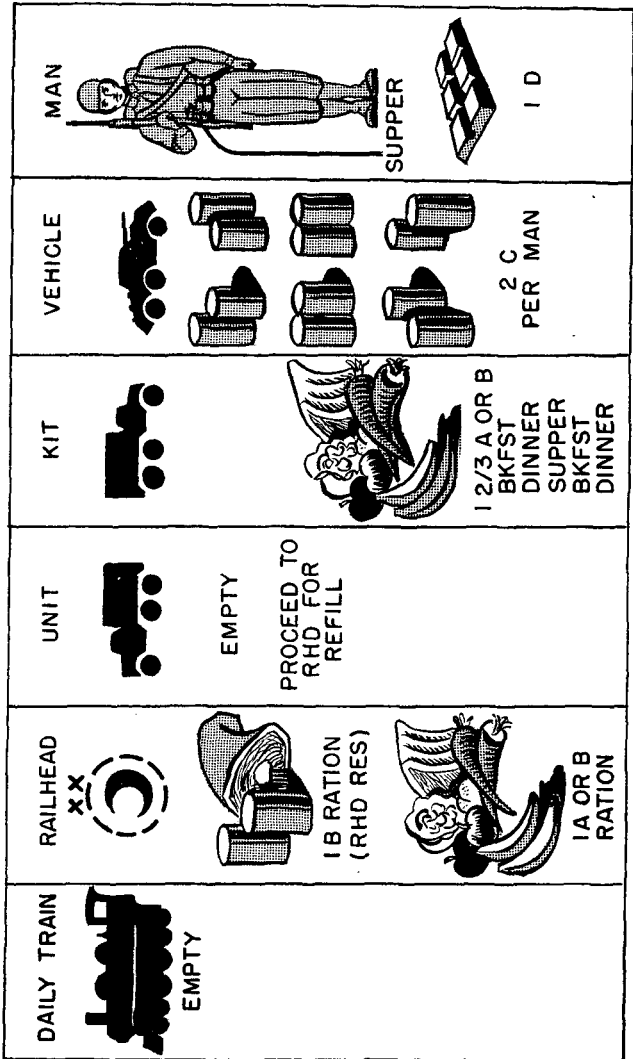


FIGURE 9.—Division ration situation after supper.

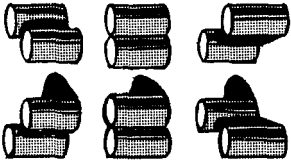
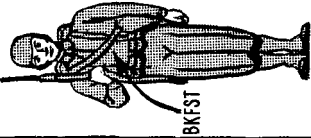
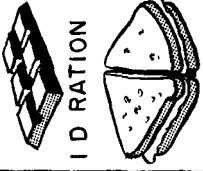
DAILY TRAIN			1 A OR B RATION
RAILHEAD X X			1 A OR B RATION (RAILHEAD RES)
UNIT RATION TRAIN			1 A OR B RATION SUPPER BKFAST DINNER (COOKED LUNCH)
KIT			1 A OR B RATION SUPPER BKFAST DINNER (COOKED LUNCH)
VEHICLE			2 C PER MAN
MAN			1 D RATION 1 LUNCH

FIGURE 10.—Division ration situation after breakfast.

reconnaissance aircraft to the supply point or distributing point.

e. All DP's should be carefully concealed from air observation if cover is available. Where cover is not available as in desert operations, dispersion of vehicles (50 to 100 yards between vehicles) will minimize losses from air attack.

f. Trucks should be loaded singly at all supply points, the remaining trucks keeping under cover until called. No lights should be permitted either in the vicinity of the supply point or the assembled trains.

g. Every effort should be made to maintain a regular supply of rations. However, due to the reserve supply of types C and D rations in the division, the emergency use of all ration trucks for ammunition or fuel supply may be expected.

h. When bivouac areas are announced, or troop locations known, water points are located within hauling distance of units by the division engineer after consulting G-4. When G-4 has approved the recommendations of the division engineer, the location of these points with hours of opening and closing are announced in division orders. Unit transportation draws water as necessary from designated points. Traffic and control at water points are functions of the division engineer.

i. Water containers are filled only at approved sources and are filled at every opportunity. All water containers both individual and organizational should be filled by daylight. (See fig. 12.)

j. In areas where water is scarce, as in desert operations, additional transportation must be furnished by higher authority to maintain an adequate water supply. In this type of operations, water will be used only for cooking, drinking, and for vehicle radiators. Water will be consumed for bathing only on division orders.

■ 61. CLASS II.—a. Replacements for T/BA supplies and equipment are not normally furnished during combat; however, essential items may be forwarded by army on the daily train to the division railhead. Normally replacements are obtained by requisition during the refitting periods after combat. Units submit requisitions through the appropriate

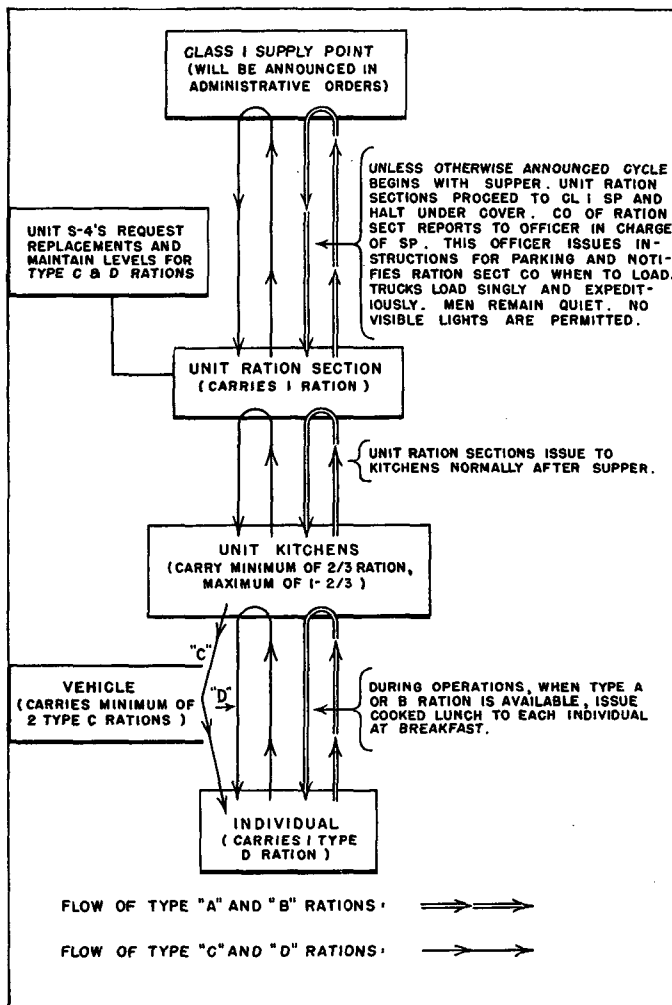


FIGURE 11.—Ration supply diagram.

division special staff section and, when allocations have been made, items are drawn by units at the designated army supply point.

b. Each division service section carries a small reserve of some items of class II supplies for replacement. A list of these items may be found in the appropriate stowage list. In protracted operations these reserves may be augmented. Replacement of these items is obtained by direct exchange at the bivouacs of the following division services: quartermaster items from the division quartermaster platoon supply section; ordnance items from the maintenance battalion; engineer items from the engineer battalion; medical items from the medical battalion; signal items from the signal company and chemical warfare items from the chemical officer at such place as he may direct.

c. When class II replacements are shipped by army to the division class I railhead, it is the responsibility of the army railhead detachment to load division trucks at the railhead. (See FM 100-10.)

d. It is the responsibility of the appropriate division service to dispatch transportation to the railhead, draw its supplies, and issue to units. This transportation must be designated by G-4 as no organic transportation is provided for this purpose. In emergencies, units may be required to furnish transportation. In this case units draw directly from the railhead.

■ 62. CLASS III.—a. Fuel and lubricant supply points are established by the army on recommendation of G-4. Since there are no organic division fuel and lubricant vehicles, these supply points must be within 35 miles of the most distant unit service parks. The location of these supply points are announced in division orders.

b. Prior to combat, all vehicle tanks are filled from unit fuel and lubricant sections. After refueling has been completed, unit fuel and lubricant sections are consolidated in the unit service park, and loads are redistributed so as to fully load the maximum number of trucks. Empty trucks are sent singly or in groups to the fuel and lubricant supply point where an exchange of drums is made. It is essential that army maintain sufficient full drums of fuel and lubricants as well as labor for loading at supply points to permit rapid

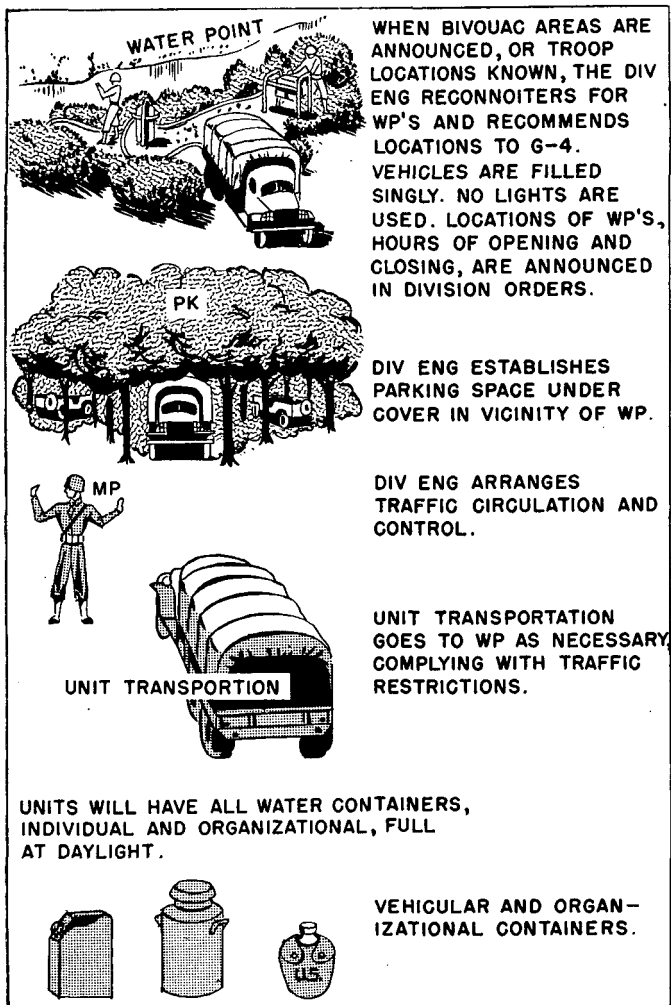


FIGURE 12.—Water distribution.

resupply of the division. It is estimated that the division will require one quartermaster company, gasoline supply, to operate the division fuel and lubricant dump. Figure 13 shows the normal method of fuel supply in the division. For details of operation of quartermaster company, gasoline supply, see FM 10-10.

c. All vehicles in the division (except motorcycles) carry fuel for at least 100 miles of operation in their fuel tanks. Extra fuel for motorcycles required for 100 miles operation is carried in the vehicles of the unit to which the motorcycle is assigned. Experience has proved that, regardless of the number of miles traveled by the division, it will consume, in active operations, approximately 100 miles of fuel and lubricants daily. Fuel for another 100 miles of operation is carried in the unit fuel and lubricant sections. It will require two and a half quartermaster truck companies to transport fuel for an additional 100 miles of normal operation. This support from army is essential for protracted operations.

d. Fuel consumption will vary according to the type of operation, terrain, weather, and age of the vehicles. Estimates of future expenditures are based on the "unit mile" which is the amount of fuel required to move all vehicles of the unit one mile. (See FM 101-10.) It is therefore essential that the unit mile be checked periodically to insure an accurate basis for planning.

e. Estimates of lubricants required are based on experience. The fuel and lubricant chart in FM 101-10 shows that lubricating oil amounts to 5 percent of fuel requirements in gallons, gear lubricant amounts to $\frac{7}{10}$ percent in gallons, and grease amounts to 2 percent expressed in pounds. These figures may be used for planning purposes with a fair degree of accuracy.

f. For planning purposes the following data will be helpful:

(1) Weight of a 5-gallon can filled with water is 50 pounds.

(2) Weight of a 5-gallon drum filled with fuel is 40 pounds.

(3) One 2½-ton truck normally carries 125 5-gallon drums. A 1-ton trailer carries 50 5-gallon drums.

■ 63. CLASS IV.—*a.* Replacement of this type of supplies, with the exception of automotive spare parts, is not normally furnished during combat. When need of immediate replace-

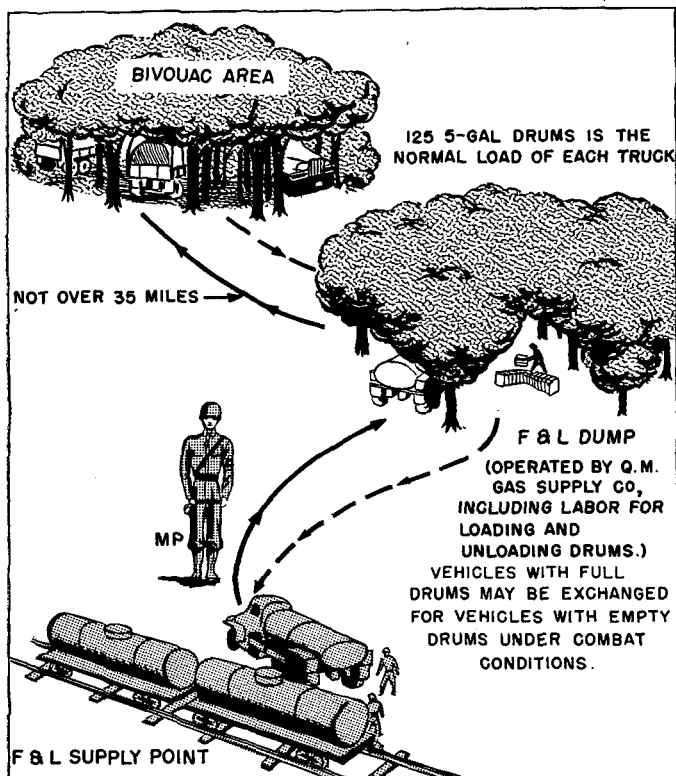


FIGURE 13.—Fuel and lubricant distribution.

NOTE.—Trucks from units report to fuel and lubricant dumps and draw fuel and lubricants to replace consumption, so as to maintain a constant level of maximum capacity in the division. Empty cans arrive at dump with caps loosened, but not removed. Each driver carries a slip of paper showing number of empty cans in his truck and type of fuel and lubricant required. Trucks load singly and expeditiously. Men remain quiet. No visible lights are permitted.

ments of certain classes such as special engineer supplies and weapon spare parts, can be foreseen, army may establish class IV dumps within reach of the division trains or may forward the supplies to the class I railhead on the daily train as required. Otherwise replacements are obtained in the refitting area as prescribed for class II supplies.

b. Army maintenance service provides replacement parts to division maintenance battalions within 48 hours of receipt of requisitions and these parts are delivered by army to division service parks.

c. Within the division, replacements for major and subunit assemblies are normally obtained by direct exchange at the maintenance battalion bivouac if worn assemblies are available for exchange. Otherwise they are obtained by requisition. Parts common sets are issued to company and separate battalion maintenance sections, regimental maintenance companies, and maintenance companies of the maintenance battalion. Replacement of these items may be either by requisition of a specific item or items or by requisition for complete sets if the sets are badly depleted. Liaison detachments are furnished from the maintenance battalion to units. Requests may be made through these detachments for delivery of essential spare parts to the unit service park. (See sec. V.)

d. When the bulky class IV supplies delivered at an army supply point exceed the capacity of the trucks of the division service concerned, its transportation must be augmented by additional trucks either from division trains or from units. This is the responsibility of the G-4 executive. Dumping of combat loads should be kept to a minimum.

■ 64. CLASS V.—a. Tables in FM 101-10 show the ammunition carried in the armored division. In order to carry the prescribed ammunition allowances for the division, two additional quartermaster truck companies will be required. These companies are not organically a part of the division and must be attached from army.

b. In addition, army must provide at least one unit of fire, all classes, within 35 miles of the most distant unit service park. Preferably this ammunition will be kept on wheels

as a rolling reserve and will operate as any army ammunition supply point. Army provides all personnel for the operation of this ammunition supply point (ASP), including personnel for truck loading. The ASP must be capable of rapid forward displacement to enable unit trains to refill without exceeding a 70-mile turn around.

c. The procedure outlined in FM 9-5 is applicable to the armored division. An accepted procedure is as follows:

(1) Supply points and location of the division ammunition office (DAO) are announced in division orders.

(2) Unit S-4's submit ammunition expenditure reports to G-4 as of midnight daily. When actual expenditures cannot be determined, a carefully estimated report based on operations of the unit will be reported.

(3) The division ordnance officer establishes the DAO on the axis of supply between the ammunition supply point and the unit train bivouacs. (See sec. V.)

(4) Unit munitions officers report to the DAO, secure credits, draw ammunition at the ASP, and report to DAO, giving him such information of the route and status of supply at the ASP as may be of value. Ammunition trucks do not stop at the DAO but proceed directly to the ASP and await the arrival of the munitions officer or his representative with the ammunition credit. When ammunition is drawn, trucks proceed directly to the unit train bivouacs.

(5) Where unit ammunition trains are insufficient to haul the required ammunition, other vehicles dump loads and shuttle. The weight of all classes of ammunition may be determined by use of the data in FM 101-10.

(6) A division dump may be established by the division ordnance officer when directed by G-4, with the ammunition carried in the division train. Ammunition will be drawn from this dump as from any other ASP.

(7) For details as to the preparation of ammunition supply forms OFM Nos. 302, 303, and 304, see FM 9-5.

(8) Within units advantage must be taken of every opportunity to redistribute ammunition. This is normally accomplished during the reorganization period. One method of redistributing ammunition from disabled tanks is to require organization maintenance crews to remove all ammu-

nition from tanks which they have not been able to repair before they are evacuated by division recovery elements. Dumps are then established in the unit service parks from which unit ammunition trucks move ammunition to the rallying point. This method or a similar one should be SOP in tank and armored car units.

(9) Figure 14 shows graphically the operation of the division ammunition supply system.

■ 65. **EMERGENCY USE OF DIVISION TRANSPORTATION.**—Priorities for emergency use of motor transportation in the armored division are as follows:

- a. Cargo trucks, division trains.
- b. Ration and kitchen trucks.
- c. Organization equipment trucks.
- d. Personnel trucks.

SECTION V

SUPPLY FUNCTIONS OF DIVISION SPECIAL STAFF

■ 66. **QUARTERMASTER.**—*a. General.*—(1) The duties of the division quartermaster are covered in FM 101-5.

(2) The functions of the supply battalion are covered in FM 17-57.

(3) In the armored division, the quartermaster is responsible for the procurement and distribution of the following supplies: rations, fuel and lubricants, quartermaster equipment (see T/BA's), individual clothing and equipment (see T/BA No. 21) and special quartermaster equipment (class IV).

b. Rations.—(1) The division quartermaster is normally at the rear echelon of division headquarters. He receives the data for the daily telegram either from G-4 directly or from the division adjutant general. The adjutant general normally obtains these data from the unit personnel sections in the rear echelon. The assistant division quartermaster prepares the daily telegram which, after approval by the division quartermaster, is forwarded to the army quartermaster by telephone, telegraph or messenger.

(2) The subsistence section, division quartermaster pla-

toon, performs all functions related to division ration distribution. This section together with personnel from the service platoon supervises the consolidation of the unit ration sections at the train bivouac or in the vicinity of the railhead as announced in division orders, breaks down the bulk division ration into unit lots (making necessary adjustments), loads unit ration sections and dispatches them to unit bivouacs, using labor from the service platoon.

(3) If rations are distributed at the railhead, the subsistence section breaks down the bulk ration in the cars and issues directly to unit ration trucks. Trucks are loaded singly under strict blackout conditions. Units having greatest distance to travel are loaded first. This method requires concurrence of the railhead officer.

(4) If conditions do not permit railhead distribution, the subsistence section draws the division ration in bulk from the railhead, using trucks of the unit ration sections or trucks of other echelons as prescribed by G-4. Rations are hauled to an easily identified location, such as the division train bivouac, where they are broken down into unit lots by the personnel of the service platoon and are issued to unit ration sections.

c. Fuel and lubricants.—The division quartermaster receives report of consumption from units through G-4, and from G-4 the operation proposed. He computes estimated requirements and forwards the daily telegram as in *b* above. He endeavors to maintain at least a day of operation of these items at all times at the class III supply point. He is assisted in this duty by the F and L section of the division quartermaster platoon. The labor for filling cans and loading trucks is furnished by the army quartermaster section operating the class III supply point. Unit F and L sections are supplied as described in section IV. (See also FM 10-10.)

d. Other quartermaster supplies.—The division quartermaster receives requisitions from units at the division rear echelon. Requisitions are consolidated by the division quartermaster supply section, quartermaster platoon, and forwarded to the army supply point or depot for action. Units are notified by division quartermaster as to time and place for drawing these supplies. If supplies are drawn at depots

by units, the division quartermaster has no further duties in this connection. If supplies come in on daily train, he must call on the supply battalion through the Assistant G-4 for the necessary trucks to haul supplies to the train bivouac and for the necessary labor from the service platoon to break the supplies down into unit lots. Issues are made to units as indicated in section IV.

e. Burial.—Burial is normally by army but may be by organization. If burial is by organization, reports will be made to the division quartermaster as to location of graves and such data as may be required for graves registration. (See TM 10-630.)

■ 67. ORDNANCE OFFICER.—*a. General.*—(1) The duties of the division ordnance officer are covered in FM 101-5 and 9-5.

(2) The functions of the maintenance battalion are discussed in FM 17-58 and 9-5.

(3) In the armored division the ordnance officer is responsible for the procurement and distribution of ammunition (including chemicals), automotive spare parts (class IV), ordnance equipment (class II), (see T/BA No. 17), as well as the salvage, maintenance, and repair of all ordnance matériel and of all automotive matériel. He is, in addition to his staff duties, commander of the maintenance battalion.

b. Ammunition.—(1) The division ordnance officer establishes the division ammunition office (DAO) with the personnel of the division ammunition section from headquarters company, supply battalion. This office is in direct radio communication with G-4 and the maintenance battalion. The division ordnance officer allocates ammunition credits to units based on ammunition expenditure reports. (See par. 64.) These allocations are sent daily to the DAO together with a report of the status of ammunition at the ammunition supply point (ASP). The allocations are not inflexible and may be exceeded in an emergency provided there is sufficient ammunition at the supply point. It is the duty of the ordnance officer to make the necessary arrangements with army to maintain constantly one unit of fire, all classes, at supply points within 35 miles of the most distant unit service park. He arranges, with personnel of the supply point, for vehicle parking, traffic control, and circulation at that installation.

(2) In the event that a division ammunition DP is established with the division ammunition reserve, the division ordnance officer establishes and operates this DP. For this purpose he uses the personnel of his section supplemented by the service platoon, headquarters company, supply battalion.

c. Automotive spare parts.—The division ordnance officer maintains a constant prescribed level of spare parts in the maintenance battalion by requisition on army depots. Unit prescribed levels of spare parts are maintained from the maintenance battalion by requisition or by direct exchange.

d. Ordnance equipment.—The division ordnance officer maintains a small supply of certain items of equipment in the maintenance battalion. Replacements from this stock are made by direct exchange or by presentation of report of survey or requisition if worn out items are not available. Unit requisitions are consolidated by the personnel of maintenance battalion headquarters and are forwarded to the supporting ordnance depot. Units are notified by radio as to time and place for drawing these supplies. Units use their own transportation to draw supplies at depots if within economical hauling distance. Otherwise the maintenance battalion draws supplies and issues at maintenance battalion bivouac.

e. Cleaning and preserving material.—The division ordnance officer maintains a prescribed level of this material in the maintenance battalion by requisitions on army depots. He replenishes unit stocks of this material from the maintenance battalion on requisition.

■ 68. SIGNAL OFFICER.—*a. General.*—(1) The duties of the division signal officer are covered in FM 101-5.

(1) The functions of the division signal company are covered in FM 17-70.

(2) In the armored division, the signal officer is charged with the procurement and distribution of signal equipment and supplies.

b. Signal equipment.—The division signal officer maintains a prescribed level of replacement equipment by requisition on army supply points or signal depot. This equipment is carried in the division signal supply section of the

signal company. Unit requisitions are sent by messenger to the signal supply section, where direct replacement is made from stock if available and the balance consolidated in one requisition on army supply points or signal depots. Units are notified when and where to draw supplies. They may be drawn by units direct from depots or the division signal supply section may draw in bulk and issue at bivouac of signal company.

c. Signal supplies.—The division signal officer maintains a prescribed level of supplies in the division signal supply section by requisition on army or signal depots. Unit requisitions are filled from this stock at the bivouac of the signal company.

■ 69. SURGEON.—*a. General.*—(1) The duties of the division surgeon are covered in FM 101-5, 17-80, and 8-5.

(2) The functions of the medical battalion are covered in FM 17-80 and 8-5.

(3) The division surgeon is charged with the procurement and distribution of all medical and dental equipment and supplies in the division.

b. Medical equipment (class II).—The division surgeon's supply agency is the division supply section of headquarters company, medical battalion. Unit requisitions for medical equipment are sent to this section by messenger. Consolidated requisitions are sent from the division supply section to the army medical supply point or depot. In combat requisitions for supplies are informal. The division supply section draws the bulk requisition and either issues to units at the medical battalion bivouac or sends the equipment forward.

c. Medical supplies.—The division surgeon maintains a prescribed level of medical supplies in the division medical supply section by requisition on army supply points. Unit requests by radio or messenger are filled by the medical supply section.

■ 70. CHEMICAL OFFICER.—The duties of the division chemical officer are covered in FM 101-5 and 3-15. The chemical officer is charged with the procurement and distribution of all chemical supplies (except chemical ammunition) and chemical equipment. Chemical ammunition is drawn on

allocated credits from the division ASP. The division chemical officer maintains no stock of chemical equipment and supplies. Unit requisitions for these items are forwarded by messenger to the chemical warfare section, forward echelon, or by radio through G-4 division headquarters, where they are consolidated and forwarded to chemical depots for action. Units are notified by radio when and where supplies are to be drawn. If supplies are forwarded on the daily train, the chemical officer must call on the supply battalion for trucks and labor to haul supplies from railhead to the division train bivouac where they are distributed to units. A representative of the chemical office supervises this distribution.

CHAPTER 3

EVACUATION

	Paragraphs
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SECTION I

VEHICULAR CASUALTIES

■ 71. GENERAL.—*a.* Evacuation of vehicles from the battlefield is the first step in maintenance, the details of which are discussed in chapter 4. Battlefield evacuation cannot be predicated on the fact that our forces will remain in possession of the battlefield. *It will be habitual to evacuate vehicles under fire*, and close cooperation between forward combat elements and maintenance personnel is essential. On the ingenuity and ability of these advanced evacuation and maintenance crews may well hinge the eventual course of the battle.

b. The division responsibility for evacuation of vehicles ends at the division service park. Ordinarily troops from army ordnance service to include one ordnance company (HM) tank, one ordnance company (HM) auto and one ordnance recovery company will be available in the army echelon to augment the ordnance maintenance in the armored division. These troops are furnished by the army and evacuate from division parks all vehicles, the repair of which is beyond the scope of tools and time available to division maintenance. Army ordnance supporting units should keep a liaison detachment equipped with radio with the division maintenance battalion. Army delivers repaired vehicles to division service parks. There should be available in army one ordnance recovery company which may be used as the situation demands to evacuate division service parks and to supplement wrecker and recovery elements of division maintenance battalions and unit maintenance companies.

■ 72. PROCEDURE WITHIN THE DIVISION.—*a.* Vehicle collecting points (VCP's) may be established forward of unit service parks. Their location will be announced in division orders. When established, division maintenance crews will evacuate from these VCP's. Otherwise forward limit of the responsibility for evacuation by the maintenance battalion normally is the unit service parks. Axes of vehicular evacuation are announced in division orders.

b. Figure 15 shows graphically the operation of the division vehicular evacuation system. Unit maintenance elements establish the unit service parks. Repair and evacuation of vehicles and equipment forward of unit service parks are normally the responsibilities of the unit maintenance platoons. These are performed as follows:

(1) Organization (company, battery) maintenance sections follow their organizations into combat as closely as the tactical situation permits. These sections perform minor repairs, assist unit liaison detachments in spotting disabled vehicles that will require repairs beyond their capabilities, and quickly tow to sheltered areas those vehicles damaged beyond their capabilities of repair.

(2) Light repair crews or liaison detachments from unit maintenance elements support each battalion. These detachments are the "eyes" of unit maintenance. They repair, within the means available, vehicles on the ground. They report to regimental maintenance the parts or unit assemblies necessary for repair, or evacuate disabled vehicles beyond their capabilities to repair to previously announced areas or the axis of movement of the unit maintenance.

(3) Unit service parks normally move by bounds. They furnish wrecker service forward to their light repair crews as required. Vehicles are evacuated to cover where temporary repairs are made if possible. If this is not practicable, vehicles are evacuated to unit service parks or to the axis of movement previously announced by the maintenance battalion. They may call on the maintenance battalion, usually through the liaison detachments of this battalion, for assistance in the performance of their missions.

c. The maintenance battalion sets up the division service park as directed by G-4. These elements are preferably

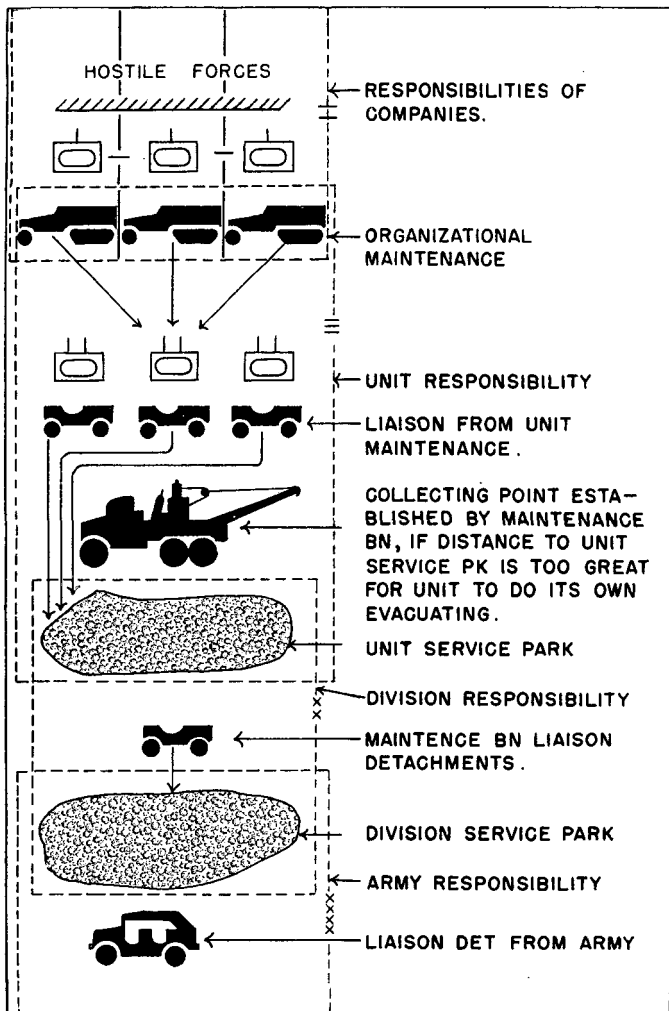


FIGURE 15.—Evacuation of vehicular casualties.

located in a town where hard standings, shelter, and repair facilities are available. When impracticable to locate in a town, they should be on a good road net and well concealed. Vehicles should be under cover and dispersed.

d. The maintenance battalion habitually furnishes liaison detachments with light maintenance facilities to major combat elements of the division. These detachments keep in touch with unit service parks and give them maximum support. They keep the division service park informed of the location of disabled vehicles which units cannot evacuate or repair, and report the need of wrecker service to evacuate from the unit park to division park, the nature of failures, requirements for parts and assemblies, and personnel necessary for repair and evacuation operations. The maintenance battalion meets these requirements in the most expeditious manner, the criterion being never to let a disabled vehicle fall into enemy hands. Liaison detachments normally remain under division control. Under certain circumstances they may be attached.

e. Except when the division is moving steadily forward, the division service park remains in a fixed position as long as it can support the division from that place, in order to give maximum time to repair of vehicles. The division service park repairs all vehicles and equipment within its means and returns to units all equipment which has been repaired.

f. In the event combat forces are detached from the immediate support of the division service park, the maintenance battalion will be prepared to support these detached forces with elements of the battalion appropriate to the size of the detached force.

g. Division service parks turn over to army service troops indicated in paragraph 71*b* all vehicles which they cannot repair and return to units within a reasonable length of time.

h. Within the division, a minimum of one driver and one crew member should remain with any disabled vehicle and accompany it through the various echelons of maintenance and assist in the repair of the vehicle. Upon completion of repairs the driver should be instructed as to the location of his unit and directed to proceed there with least delay. If vehicle repair will take an excessive length of time, or must

be accomplished by army units, men will be returned to units by first available transportation.

i. Within division service parks, maintenance is continuous both day and night. By properly locating the service parks under adequate cover and by keeping movement within the parks to a minimum, it will be possible to perform daylight maintenance with little interference by enemy air attacks. In order to perform night maintenance, blackout facilities must be improvised. The best method is to locate in a town which has garages that may be blacked out. Other methods must be improvised where town facilities do not exist. Maintenance crews must have light to perform efficient night maintenance.

j. It will be normal for the maintenance battalion to leapfrog its companies forward along the axis of vehicular evacuation. One or more companies may go forward and open a new service park while the other companies continue to clear the disabled vehicles in the old service park.

SECTION II

PERSONNEL CASUALTIES

■ 73. ORGANIZATION.—Evacuation of personnel casualties is also covered in FM 8-5. For the detailed organization of the armored division medical units see current Tables of Organization. Armored division medical units are organized as follows:

a. The armored medical battalion consists of a headquarters and headquarters company and three medical companies.

b. Each medical company consists of a company headquarters, a litter platoon, an ambulance platoon, and a treatment platoon.

c. Unit and separate battalion medical detachments are organized into sections appropriate to the size of the unit supported and are equipped with either cross-country ambulances or half tracks with fittings for litters.

■ 74. EMPLOYMENT.—For detailed instructions on employment of armored medical units see FM 17-80.

■ 75. SUPPORT OF ARMORED FORCE MEDICAL UNITS.—*a.* Army evacuates division treatment stations. This is accomplished by having army ambulances support the division treatment platoons. When the division operates as a part of an independent armored corps, mobile evacuation hospitals are attached to the corps. Ambulances from supporting medical units evacuate division treatment stations to the attached evacuation hospitals. The next higher medical echelon evacuates the mobile evacuation hospitals.

b. Army replenishes all division medical supplies by sending them forward to the medical section, headquarters company, by daily train to railheads, or they may be obtained by unit transportation at a medical depot. When divisions operate as a part of an independent armored corps which has attached army medical units, the armored corps performs this function.

■ 76. PROCEDURE WITHIN THE DIVISION.—*a.* Figure 16 shows diagrammatically the system of evacuation of personnel casualties within the armored division.

b. Axes of evacuation will be announced in division orders.

c. Units establish aid stations on their axes and report their location to division headquarters, forward echelon.

d. Units support their combat elements with the necessary ambulances or half-track carriers and medical personnel. These elements evacuate wounded to unit aid stations or established collecting points on axes of evacuation. Unit surgeons maintain close liaison with supporting medical elements.

e. The division medical battalion supports each major combat element of the division with balanced ambulance and litter elements. These elements travel the axes of evacuation and evacuate from unit aid stations or collecting points to division treatment stations.

f. Treatment stations are mobile clearing stations for the division. Each consists of a platoon headquarters, an operating section, and a casualty treatment section. There are three treatment platoons in the division, each capable of operating a treatment station. One platoon is organized as a gas casualty treatment station. It is the function of each

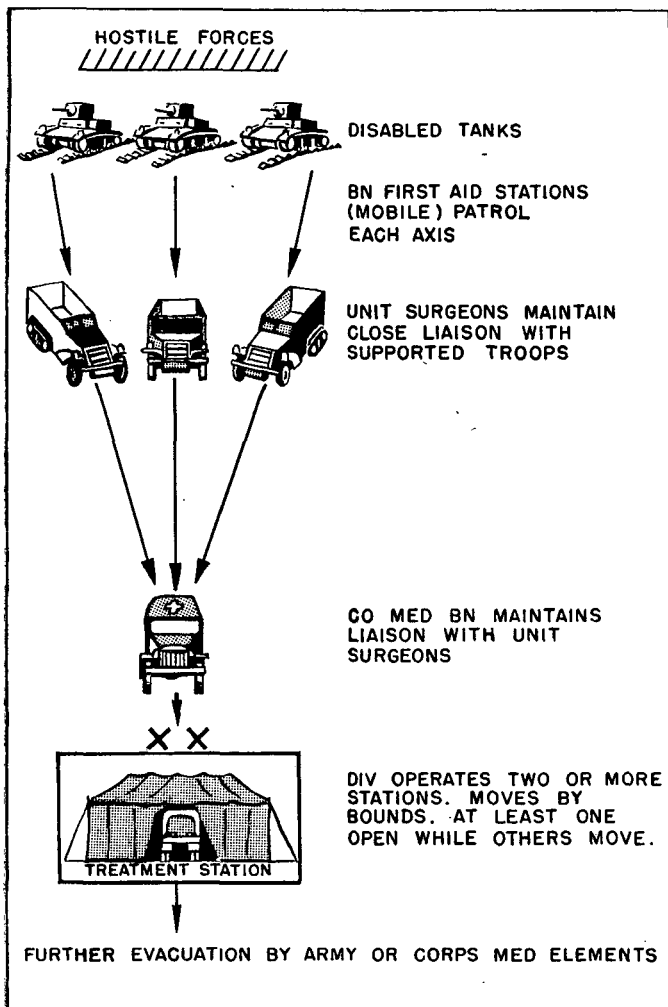


FIGURE 16.—Evacuation of personnel casualties.

station to prepare casualties for further evacuation by army medical units. Treatment stations move by bounds; at least one station remaining open while the others move. The gas casualty treatment station will operate as a normal treatment station if gas is not encountered.

g. Figures 17 to 20, inclusive, show evacuation of a casualty from the scene of battle to division treatment station.

SECTION III

MISCELLANEOUS

■ 77. **SALVAGE.**—Salvage operations generally are covered in FM 100-10. Salvaged vehicles and weapons other than small arms are collected by units at unit service parks. Small arms are evacuated to the treatment stations with casualties. The division maintenance battalion will evacuate all salvage material from unit parks and division treatment stations to the division park. Repaired salvage material or usable parts thereof are reissued to the appropriate agency; the balance is evacuated by army. Locations of this material must be reported to army G-4. This is the responsibility of the division ordnance officer. See also FM 9-5, FM 9-10, FM 10-10, and TM 10-260.

■ 78. **CAPTURED MATERIAL.**—Captured material is collected by units at unit service parks and, after examination by unit S-2's, is evacuated by division service units to the division service park. Further evacuation is army responsibility.

■ 79. **PRISONERS OF WAR.**—*a.* The military police platoon establishes prisoner of war collecting points on previously announced axes of prisoner evacuation in rear of each major task force of the division. Units evacuate prisoners to these axes and move them under minimum guard to collecting points. Prisoners are turned over to the military police at this point who hold them until they are evacuated by mobile MP evacuation squads furnished by the attached army MP battalion, operating under corps control, if the division is operating as a part of a corps; or by army MP battalion. (See fig. 21.)

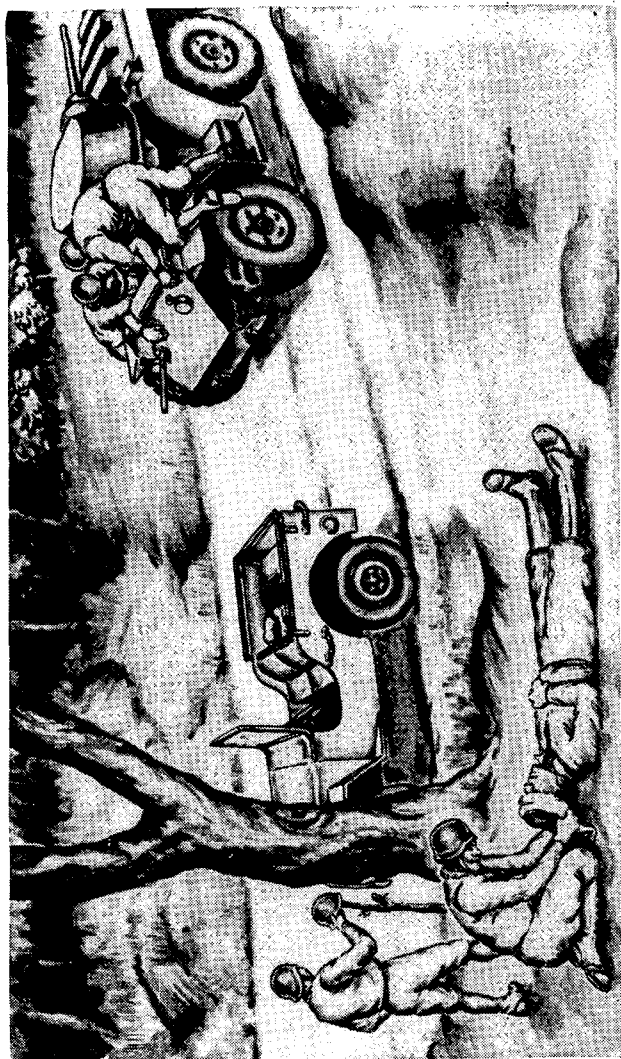


FIGURE 17.—Step 1. First aid given by vehicle crew. Casualty left for collection by battalion section, unit medical detachment.

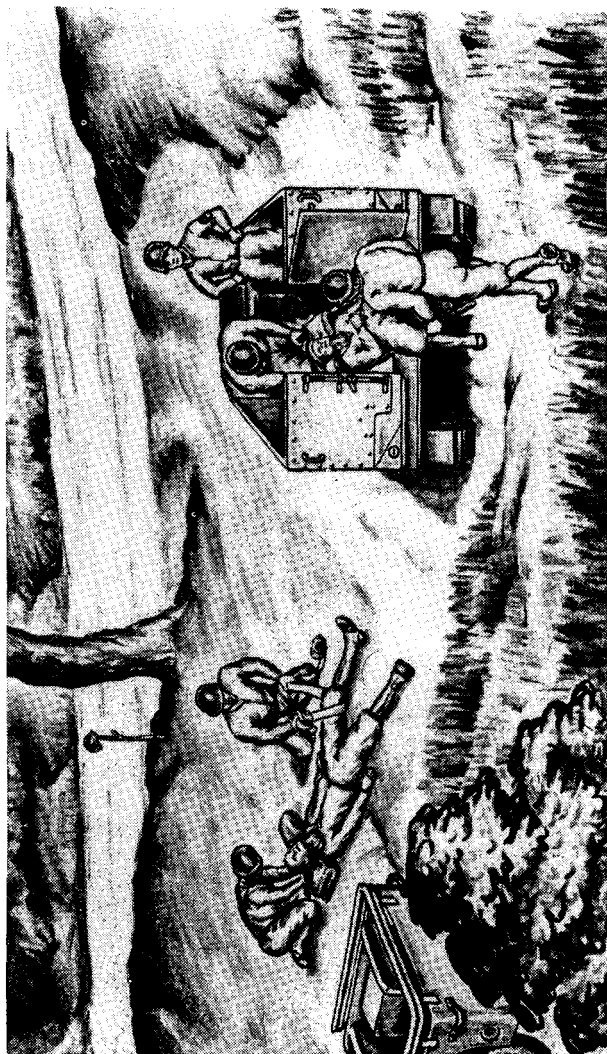


FIGURE 18.—Step 2. Emergency treatment by litter bearers. Casualty is evacuated to unit aid station or axis of evacuation by medical half-tracks.

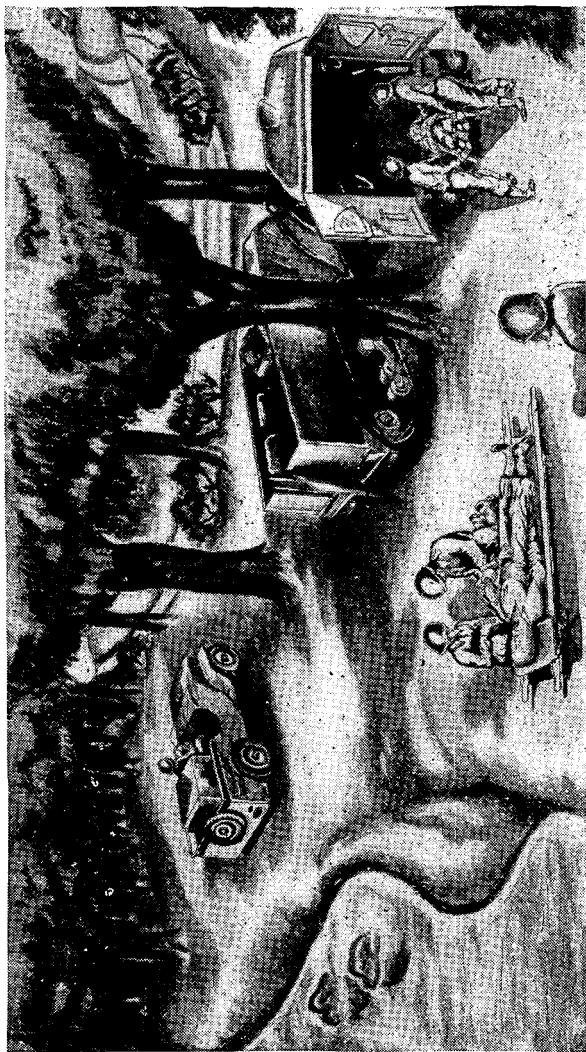


FIGURE 19.—Step 3. At unit aid station or on axis of evacuation, casualty is prepared for further evacuation by ambulance platoons to division treatment station.

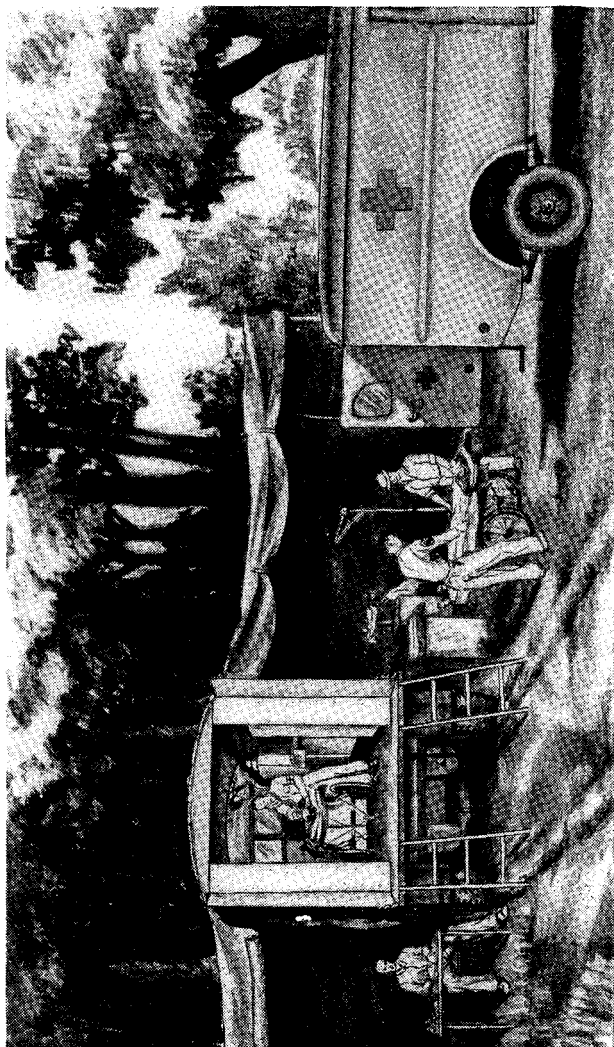


FIGURE 20.—Step 4. At division treatment station casualty is prepared for further evacuation by army ambulance units.

b. Prisoners are disarmed and immobilized by capturing units. Immobilization may be effected by removing shoes, cutting buttons from clothing, or other expedients.

c. Unit interrogation of prisoners will be confined to matters of immediate concern to the unit. (See FM 30-15.)

■ 80. **TRAFFIC CIRCULATION AND CONTROL.**—*a.* The plan of traffic circulation giving main supply roads, special assignment of routes, priorities and restrictions, will be announced in division orders.

b. The plan will also show location of critical points, bridge capacities, and detours as determined by engineer reconnaissance.

c. In the theater of operation, all movement at night will be without lights.

d. Routes and establishments will be marked by division MP's at critical points. Routes within establishments are marked by establishing unit.

e. Traffic circulation within supply installations is the responsibility of the supply agency.

f. Guides and necessary traffic control posts will be established by the division provost marshal as directed by G-3.

g. Maintenance of main supply roads and special routes, including strengthening of bridges, is a function of the division engineer. Priorities of work will be established by G-3 and G-4. Normally priorities are as follows:

- (1) Constructing and strengthening bridges.
- (2) Maintenance of roads on main routes of advance.
- (3) Maintenance of main supply roads.
- (4) Access roads, entrances to and exits from bivouac area and division supply installations.

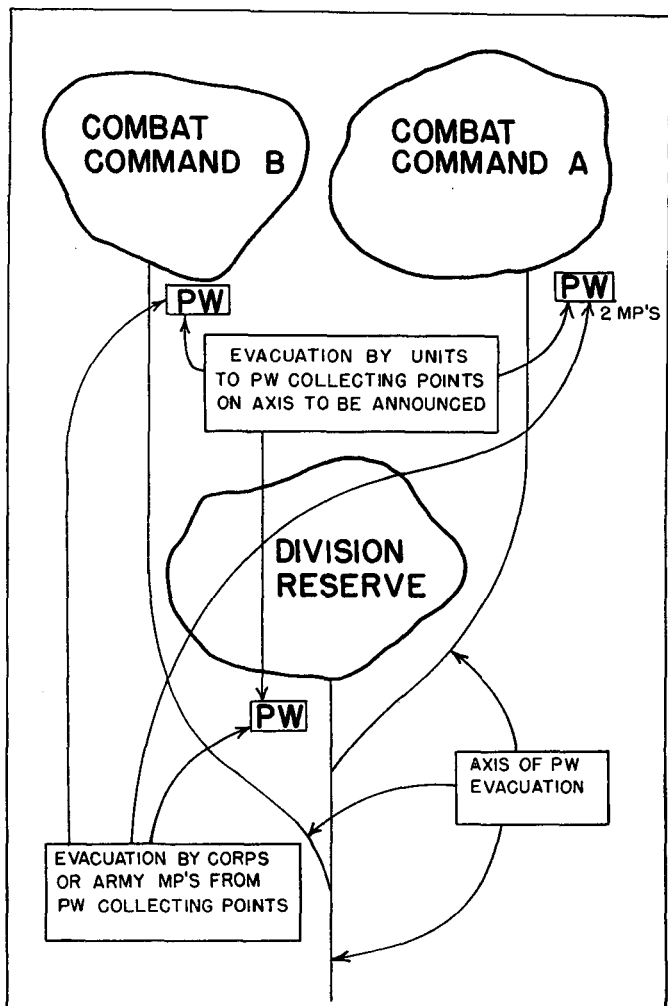


FIGURE 21.—Prisoner of war collection, armored division.

CHAPTER 4

MOTOR VEHICLE MAINTENANCE

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SECTION I

GENERAL

■ 81. REGULATIONS GOVERNING.—*a.* Maintenance of motor vehicles in armored force units will be in accordance with the following regulations and manuals:

- (1) AR 850-15, Military Motor Vehicles.
- (2) FM 25-10, Motor Transport, and other pertinent basic Field Manuals.
- (3) Technical Manuals. Technical Manuals are listed in FM 21-6.
- (4) Circular 1-10, O. Q. M. G.
- (5) Technical Service Bulletins of the Ordnance Department.
- (6) Standard Nomenclature Lists and Technical Bulletins of the Ordnance Department.
- (7) Charts, Shop Manuals, and instructional data issued by manufacturers.
- (8) Current instructions issued by the Armored Force and higher headquarters.

b. Motor maintenance elements of all echelons of maintenance will secure, as prescribed in AR 310-200, a complete file of such of the above listed publications as pertain to the vehicles which they are required to maintain.

c. The methods and procedure set forth in this chapter are supplementary to those contained in the publications listed above and specially adapted to the needs of armored force units.

■ 82. FUNDAMENTAL CONSIDERATIONS.—Adequate maintenance is essential in the conduct of military operations by armored force units. The first and basic consideration is the attainment of the utmost possible in correct operation of vehicles and in preventive maintenance. Every means of improving maintenance will be exploited with a view to keeping vehicles in operation and minimizing the need for repair. *Any division of maintenance which tends to permit the lower echelons of the operating organizations to expend their time and energy on higher echelon work at the expense of preventive maintenance is not to be considered.* However, there will be occasions when a company or regiment will be able with their personnel and tools to effect repairs and keep in service those vehicles which otherwise would be lost to their units. In such cases, no technicalities will be allowed to interfere with a commander in his efforts to keep his vehicles operative.

a. *Driver maintenance.*—(1) The training of drivers in the operation and maintenance of conventional type vehicles and motorcycles is prescribed in FM 25-10, TM 21-300, TM 10-460, and TM 10-515. Instruction in training of drivers of combat vehicles is covered in FM 17-5.

(2) Training of drivers must be thorough and systematic. It includes not only instruction in proper operation of the vehicle, but instruction in preventive maintenance functions definitely charged to him. *Proper driving and driver maintenance is a major factor in obtaining the maximum performance from vehicles with a minimum loss of time due to break-downs.*

(3) Proper and thorough training of drivers is not sufficient. In addition there must be developed such a personal interest and pride in his vehicle that a driver will willingly work and cooperate for its benefit. This requires the permanent assignment of a driver to each vehicle, and reduction to the minimum of indiscriminate rotation of drivers with the consequent division of responsibility and interest. Similarly, changes in car commanders and crews of combat vehicles will be avoided whenever practicable.

(4) All crew members must be thoroughly instructed in driver maintenance and in minor repairs. Crews should

accompany their vehicles during company maintenance operations in order to learn how to effect emergency battlefield repairs within the limits of available tools.

b. Company maintenance.—Company mechanics must understand that their primary function is preventive maintenance; and that their principal efforts will be to detect and correct minor defects before they develop into major troubles. This is accomplished by scheduled preventive maintenance operations, performed at definite intervals on a mileage or time basis, as prescribed in pertinent regulations and in this chapter. Mileage and a time basis are variables which are greatly influenced by type of operation, climate, terrain, and other factors which adversely affect wear and longevity of parts and lubricants. Company mechanics will be encouraged to make recommendations for changes in these variables. Such recommendations will be given proper consideration by unit maintenance officers and, when justified, put into effect or existing methods modified. The inspection of a vehicle by a company mechanic will be careful and detailed, and will result in the determination of repairs necessary as well as discovering undue wear and vehicle abuse caused by faulty driving. Company mechanics will make only such minor repairs and replacements as are authorized by the company maintenance officer who will be governed by existing regulations and the requirements of the particular situation including available facilities, tools, spare parts, tactical situation, qualifications of his mechanics, and the time element. The esprit of maintenance personnel must be developed to the highest extent. *Mechanics must be imbued with a wholehearted desire to keep their vehicles rolling regardless of the cost to them in sleep, food, or comfort.* As maintenance duties in the field are particularly arduous, every effort must be made to provide adequate rest for maintenance personnel.

c. Regimental (separate battalion) maintenance.—Regimental and separate battalion maintenance companies (platoons) (sections) must be thoroughly instructed as to the importance of their inspections and preventive maintenance functions. The regimental (separate battalion) motor and maintenance officers should be constantly on the alert to see

that repairs and unit replacements not definitely their responsibility are not attempted at the expense of preventive maintenance operations and inspections which definitely are charged to them.

d. Field maintenance.—Maintenance activities under the varying conditions of service in garrison, in the field, on the march, in combat, and in a rest area refitting after operations, may differ widely in scope and character. However, training must be based on the assumption that personnel, tools, and materials will be those available in the field, and that time and the tactical situation will be the principal element determining the maintenance operations or repairs each echelon will be able to perform. As a general rule no combat organization will contemplate the performance of any maintenance job which ordinarily would require more than 4 to 6 hours for its completion. Neither will they attempt to rebuild unit assemblies of any type. The maintenance battalion performs minor rebuilds. On the other hand, in a situation where the next higher echelon cannot take over a repair job that is ordinarily its responsibility while the lower echelon is able to effect it and thus keep a needed vehicle in service, the lower echelon will make the repairs. It must be kept in mind, however, that it is usually more important for unit maintenance personnel to keep the active vehicles operating than to restore an inactive vehicle to service.

e. Flexibility of maintenance.—It is neither desirable nor practicable to determine in advance the solutions to all possible problems of maintenance. Intelligent and satisfactory solutions are dependent upon the training, efficiency, initiative, common sense, and lack of restriction upon motor and maintenance officers, and their ability to adapt themselves to constantly changing situations.

■ **83. PERSONNEL AND TRANSPORTATION.**—Personnel provided for the performance of maintenance operations, and vehicles allotted for the transportation of this personnel with their maintenance tools, equipment, spare parts, and supplies are authorized in the Tables of Organization for armored force units.

■ 84. **TOOLS AND EQUIPMENT.**—Tools and equipment authorized, including the basis of issue to individuals and organizations, are prescribed in Tables of Basic Allowances for armored force units.

SECTION II

OPERATIONS

■ 85. **COMBAT ORGANIZATIONS (UNITS).**—*a. General.*—Maintenance performed by combat organizations may be grouped into two general classifications:

(1) Scheduled preventive maintenance operations and inspections;

(2) Corrective maintenance which includes adjustments, repairs, and unit replacements made either in the accomplishment of (1) above or in restoring vehicles to operating condition after a failure has occurred.

b. Scheduled maintenance.—(1) *Wheeled vehicles.*—Scheduled preventive maintenance operations and inspections to be performed by operating organizations on wheeled vehicles of all types are prescribed in AR 850-15 and FM 25-10, and amplified in Technical Manuals pertaining to each type of vehicle. (For list of appropriate manuals, see FM 21-6.)

(2) *Track vehicles.*—Scheduled preventive maintenance operations and inspections to be performed by operating organization on track vehicles are performed as indicated below:

(a) *Tanks.*

Daily inspection.

50-hour inspection.

100-hour inspection.

NOTE.—300-hour inspections are performed by service troops.

(b) *Half-track vehicles.*

Daily inspection.

1,000-mile inspection.

3,000-mile inspection.

6,000-mile inspection.

(3) *Daily tank check.*—The daily check of tanks by the tank crew is covered in FM 17-5.

(4) *Periodic tank checks.*—The 50-, 100-, 200-, and 300-hour check of tanks will be in accordance with instructions issued by the Ordnance Department.

(5) *Half-track vehicle checks.*—The daily and 1,000-mile check for half-track vehicles is the same as that prescribed for wheeled vehicles. The 3,000-mile check is the same as that prescribed for the 6,000-mile check on wheeled vehicles. (See FM 25-10.)

c. Allocation of maintenance operations to operating organizations.—(1) Operating organizations perform the maintenance operations indicated in AR 850-15, FM 25-10, Circular 1-10, O. Q. M. G., and as amplified from time to time by orders of higher headquarters.

(2) Maintenance operations to be performed are those operations that the company and regiment (separate battalion) are equipped to perform in garrison, in the field, on the march, or in camp. It is essential that it is clearly understood by all that in the division of maintenance operations between echelons, flexibility (both up and down) is authorized and will be encouraged.

(3) Actual maintenance operations that are performed at any time or place are determined by the motor or maintenance officers concerned, who will be governed by current orders and the dictates of the situation.

(4) Regimental and separate battalion commanders in accordance with the provisions of AR 850-15 and the requirements of each situation are responsible for such division of maintenance work between the regiment (separate battalion) and the company as will insure the best results.

■ 86. MAINTENANCE SERVICE (ORDNANCE).—*a.* The ordnance maintenance battalion is responsible for the maintenance indicated in AR 850-15, FM 25-10, Circular 1-10, O. Q. M. G., and TM 10-545.

b. The battalion requisitions initial stocks and is responsible for the replenishment of stocks of spare parts, parts common, and supplies for both the first and second echelon requirements of operating organizations as well as for their own third echelon requirements. Initial stocks are the "working capital" furnished as provided by chiefs of supply

branches concerned, which are kept in normal balance through annual motor maintenance funds or depot credits. See paragraph 63b for methods of procurement. Spare parts and supplies of initial stocks authorized operating organization (first and second echelon) are issued to and kept in those organizations and are kept at a balanced or normal level by issues, on requisition or replacement, from the third echelon replenishment stock.

c. The maintenance inspections and service performed by the maintenance battalion of the division include the following:

- (1) Supply of major and minor parts and unit assemblies for vehicles.

- (2) Technical assistance to operating organizations in effecting maintenance required.

- (3) Technical checks on all maintenance accomplished by maintenance units other than the maintenance battalion.

- (4) Technical inspection of motor vehicles.

- (5) Overhaul of accessory unit assemblies and subassemblies such as magnetos, starters, generators, carburetors, and similar parts.

- (6) Distribution of oil, gasoline, lubrication, and antifreeze charts for seasonal use.

- (7) Replacement of all unserviceable parts or units with new or serviceable parts.

- (8) Assistance in salvaging disabled unit vehicles when requested by unit supply officer.

- (9) Making recommendations which will facilitate the repair of vehicles.

- (10) Responsibility for the check to see that pertinent technical information has been procured as provided in section I.

- (11) Responsibility for third echelon maintenance.

- (12) Supervision of use of experimental equipment.

- (13) Spot inspection under direction of the division commander.

- (14) Visits by liaison officers to units to learn needs of the unit.

d. It is the responsibility of the maintenance battalion commander to acquaint his division commander, through

the division automotive officer, with all maintenance problems of the division. This is accomplished by frequent inspections of the activities of all units, by constructive assistance, and by conference with unit motor and maintenance officers. This method of insuring compliance with technical instructions issued by the services and of improving maintenance in the lower echelons will materially reduce the burden of the services. A check will invariably be made when new vehicles are received, to insure compliance with the provisions of Technical Service Bulletins covering the inspection and break-in periods under the manufacturer's guarantee. It is the responsibility of all motor and maintenance officers to familiarize themselves with the powers and limitations of higher echelon maintenance and to help develop a spirit of cooperation and teamwork in keeping vehicles operative.

SECTION III

SPARE PARTS AND SUPPLIES

■ 87. GENERAL.—Maintenance spare parts and supplies to be transported by operating organizations (within the capacity of the transportation provided) are the estimated requirements for organization maintenance for at least 24 hours of combat service. Spare parts necessary for the maintenance of all types of vehicles within the organization will be maintained.

■ 88. WHERE TRANSPORTED.—The required parts and supplies will be kept on hand in each unit. Suitable containers will be provided, also a method of loading these supplies in the authorized transportation determined for each company, regiment, or similar unit. These spare parts will be protected against rust, deterioration, and damage.

SECTION IV

DIVISION AUTOMOTIVE OFFICER

■ 89. DUTIES.—*a.*—The duties of division automotive officer are covered generally in FM 101-5. The division automotive officer is an assistant to G-4, a general staff officer. As such,

he acts as advisor to the division commander and staff on automotive matters. He is not an operating motor or maintenance officer in that his duties consist principally of coordinating all automotive training and maintenance in the division.

b. The duties in detail of the automotive officer are as follows:

(1) Supervision of driver training, both officers and enlisted men.

(2) Development of policies and recommendations to higher headquarters on all automotive matters pertaining to the division.

(3) Supervision of all automotive repair, supply, and reclamation activities, and dissemination of the technical standards for the operation thereof.

(4) Preparation of preventive maintenance schedules for all echelons of maintenance.

(5) Inspection of all automotive training operation and maintenance.

(6) Inspection of the adequacy and sufficiency of equipment and supplies.

(7) Recommendations for tactical location of units of maintenance echelons.

(8) Rendition of reports to higher and lower headquarters.

(9) Recommendations for attachment of division maintenance units to lower echelons as required by the situation.

(10) Recommendations for attachment to the division of maintenance and recovery elements from higher headquarters.

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